MASS. Y3.LP1:R76/v.1

Route 9 Corridor Study

Hadley • Amherst • Northampton

Land Use and Development Trends

UMASS/AMHERST
UMASS/AMHERST
312066 0362 6005 4

932/253

6/92

PIONEER VALLEY
PLANNING COMMISSION

ROUTE 9 CORRIDOR STUDY

LAND USE AND DEVELOPMENT TRENDS

[v. 1]

Prepared by the

Pioneer Valley Planning Commission

June 1992

Prepared in cooperation with the Massachusetts Highway Department and the U.S.
Department of Transportation - Federal Highway Administration and
Federal Transit Administration.

Staff Credits
Prepared by Christopher Curtis, Principal Planner
under the direction of Timothy W. Brennan, Executive Director.
Design and typsetting by Shaun Hayes, Principal Planner/Cartographer,
typing by Joanne Betournay, maps by Frank Biasi,
cover by van Schouwen Associates.

TABLE OF CONTENTS

Page

1.0 INTRODUCTION

1.1 Study Objectives 1
1.2 Description of Hadley and Route 9 Corridor 1

2.0 LAND AND ENVIRONMENTAL CHARACTERISTICS

2.1 Prime Farmland and Soil Characteristics 3
2.2 Floodplain Areas 3
2.3 Aquifer Recharge Areas 3
2.4 Wetland Areas 3

3.0 EXISTING LAND USE

3.1 Data Collection and Mapping 5
3.2 Existing Land Use and Employment 5
3.3 Land Use Patterns 6
3.4 Business, Residential, Institutional Use Characteristics 9
3.5 Business Survey Results 10

4.0 ZONING REVIEW

4.1 Purpose 15
4.2 Existing Route 9 Zoning - Hadley 15
4.3 Existing Route 9 Zoning - Northampton 16
4.4 Existing Route 9 Zoning - Amherst 16
4.5 Problem Areas in Existing Zoning 16

5.0 DEVELOPMENT CONSTRAINTS AND INCENTIVES

5.1 Land Availability and Cost 21
5.2 Public Utilities 21
5.3 Environmental Constraints and Zoning Restrictions 22
5.4 Summary of Development Constraints and Incentives 22

6.0 ROUTE 9 BUILD-OUT ANALYSIS 1988-2010

6.1 Purpose 23
6.2 Procedure 23
6.3 Conclusions 26

7.0 CURRENT DEVELOPMENT TRENDS AND ESTIMATED TRAFFIC IMPACTS

7.1 Route 9 Development Trends 29
7.2 Route 9 Development 1987 - 1990 29
7.3 Projected Traffic Impacts of Route 9 Development 1987 - 1990 32

7.4 Projected Traffic Impacts of Route 9 Development 1990 - 2010 32
7.5 Planned Development at the University of Massachusetts 32
7.6 Current Development Trends Outside the Route 9 Corridor 35

8.0 ALTERNATIVE LAND USE STRATEGIES 37

9.0 RECOMMENDED LAND USE STRATEGIES

9.1 Summary of Recommendations 43
9.2 Intergovernmental Recommendations 44
9.3 Municipal Recommendations 44
9.4 State Agency Recommendations 46
9.5 University and Five Colleges, Inc. Recommendations 50

10.0 STATUS OF RECOMMENDATIONS AND IMPLEMENTATION 51

APPENDICES

A. DRAFT INTERGOVERNMENTAL MEMORANDUM OF AGREEMENT

B. MODEL COMMERCIAL CORRIDOR SITE PLAN APPROVAL BYLAW AND TRIP REDUCTION BYLAW

C. MODEL SIGN BYLAW

D. MODEL OFF-STREET PARKING AND LOADING STANDARDS

E. TRANSPORTATION BOND ISSUE AMENDMENT

F. MODEL PLANNED UNIT DEVELOPMENT ORDINANCE

G. ACCESS MANAGEMENT TECHNIQUES

H. HIGHWAY CORRIDOR DESIGN CONCEPTS

I. MODEL TRAFFIC ACCESS REGULATIONS

Digitized by the Internet Archive
in 2015

https://archive.org/details/route9corridorst01pion

1.0 INTRODUCTION

1.1 Study Objectives

This memorandum has been prepared by the Pioneer Valley Planning Commission as part of a detailed transportation/land use study of the Route 9 corridor in Hadley, Amherst and Northampton. The Route 9 Corridor Study is being undertaken to investigate the increasing traffic congestion and safety problems on Route 9, and to recommend remedial actions to help correct these problems.

The objectives of the land use component of this study are to:

- Determine current land use patterns and development trends within the Route 9 Corridor;
- Assess the impacts of existing and future land use on Route 9 traffic generation and safety;
- Recommend appropriate land use policies to minimize adverse future traffic impacts;
- Preserve key open space areas and prime agricultural lands within or adjacent to the Route 9 corridor;
- Provide opportunities for public participation in the planning process by residents, landowners, business leaders and town officials;
- Provide a specific action plan which will promote well-planned commercial and residential development within the Route 9 corridor, and will benefit the community as a whole by ensuring wise use of public services, utilities and natural resources.

1.2 Description of the Route 9 Corridor

The Route 9 Corridor is defined, for purposes of this study, as extending from the Damon Road intersection in Northampton eastward through Hadley to the University Drive intersection in Amherst. Hadley is located at the center of the Route 9 corridor which is the major east-west transportation route in Hampshire County and the northern Pioneer Valley Region. Route 9 is a state-maintained highway which connects the neighboring high-growth communities of Amherst (to the east of Hadley) and Northampton (to the west).

Amherst is a growing college community with a 1980 population of 33,229. Northampton is a business/retail center and residential community of 29,286 persons. Hadley is a residential-agricultural community with a 1980 U.S. Census population of 4,125.

Increases in both commercial development and traffic volumes along the Route 9 corridor are closely linked to overall growth trends in Hampshire County. Both Northampton and Amherst have experienced high rates of commercial and residential growth. Between 1980 and 1984, Amherst's new housing construction totaled 240 units, and Northampton had 199 new housing units. Available commercially-zoned land has almost been exhausted in each community and residential land prices have skyrocketed. In addition, Amherst adopted a two-year building moratorium which has increased development pressures on a number of surrounding towns, especially Hadley. As a result, the few remaining large blocks of open, accessible land along the Route 9 corridor in Hadley are now even more attractive and vulnerable to commercial and residential development. At the same time, however, the ability of the corridor to handle substantial increase in vehicle traffic is unrealistic, which makes the prospect of "gridlock" (i.e., excessive traffic congestion) and its devastating economic consequences, a probability rather than a possibility.

Because commercial development has not yet totally inundated the Route 9 corridor in Hadley, there is opportunity for improved management. However, time for action is very short and commercial development has already begun to accelerate at an alarming rate. The Route 9 corridor is already the site of four Hadley shopping centers or malls: Hampshire Mall, Mountain Farms Mall, Hadley Village Barn Shops, and Campus Road Mall. The current proliferation of detached convenience stores, automotive dealers and service shops, medical centers, fast food restaurants and mini-malls forebodes an unbroken and chaotic 5-mile commercial strip development with associated traffic and safety problems pervasive throughout Hadley's Route 9 corridor and ultimately the Town as a whole. This is precisely the reason why remedial action is needed.

Growth and traffic problems along the Route 9 corridor will surely be influenced by several developments of regional significance presently on the drawing boards. Key examples include: the University of Massachusetts plans to build a 10,000-seat Multi-Purpose Arena about one mile north of Route 9 in Hadley; construction of a new Polymer Research Center to be constructed near Route 9 in Amherst which has received a commitment of state financial assistance; and WestMass Area Development Corporation, which has purchased land for a proposed $20 million industrial park to be situated on 78 acres of land near the intersection of Routes 9 and 116 in Hadley. These and other projects will not only impact the Route 9 corridor, but will likely serve as indirect growth stimulants for the large areas of open, agricultural, commercial or industrially-zoned land that remain in Hadley both within and outside the Route 9 corridor itself.

The impact of unmanaged growth in the Route 9 corridor on Hadley and the region is manifested in many ways. Increasing traffic congestion and traffic accidents are serious concerns. Changes in the scenic, rural, and historic character and visual appeal of Hadley are among the most noticeable manifestations of a community undergoing rapid change. Other impacts include the loss of open space, scenic vistas and prime farmlands, while new development steadily increases demands placed on municipal services and utilities such as sewer and water systems. Yet, if growth is carefully planned and managed, it can yield community benefits such as a strong and diversified tax base, job opportunities, shopping facilities and attractive and affordable housing units for all segments of the population. Indeed, the issue of affordable housing in Hadley is another pressing problem that is directly linked to the Route 9 corridor. This stems from the fact that the Route 9 corridor provides the greatest access to public services, utilities and available land which, thereby, makes it very attractive to the large residential projects proposed for the Town.

Traditional approaches to the problems of growth management in the Route 9 corridor in are not likely to be successful. An innovative, multi-faceted approach is needed, yet one which is workable and understandable to largely part-time and volunteer community officials, business leaders and citizens. Such an approach would give Hadley the ability to exert greater local control over the future of the Route 9 corridor, yet offer flexibility and incentives to achieve the type of development Hadley feels will stay in keeping with its character as a scenic and rural agricultural community.

2.0 LAND AND ENVIRONMENTAL CHARACTERISTICS

Route 9 in Hadley passes through a landscape that was once rural farmland, but has become over the past twenty years, an increasingly dense commercial strip development. The characteristics of the land and the few environmental constraints to development have combined to make the Route 9 corridor attractive for commercial growth. The land along Route 9 includes several important natural features including prime farmland soils, floodplain areas and aquifer recharge areas.

2.1 Prime Farmland and Soil Characteristics

Hadley is renowned for having some of the state's best farmland soils. The Route 9 corridor cuts through the heart of Hadley's farming district. Approximately 90% of the soils in the Route 9 corridor are classified as prime farmland soils, according to U.S. Soil Conservation Service maps. Unfortunately, the best soils for farming are also prime lands for development, due to their well-drained, flat characteristics. In many sections of the Route 9 corridor, these farmlands have already been covered by shopping malls and other commercial or residential structures.

2.2 Floodplain Areas

The western end of the Route 9 corridor in Hadley is adjacent to the Connecticut River. Route 9 passes through the 100-year floodplain of the Connecticut River for a distance of almost three miles from the Coolidge Bridge on the west to near Middle Street on the east. All properties with frontage on Route 9 in this segment are within the 100-year floodplain.

2.3 Aquifer Recharge Areas

The aquifer recharge area for Hadley's Callahan Wellfield and public water supply intersects the Route 9 corridor. The aquifer recharge area for these public wells, which are located off Bay Road, has been mapped by the Pioneer Valley Planning Commission, and generally follows the Fort River drainage. This recharge area intersects the Route 9 corridor for a distance of approximately one mile near the Spruce Hill Road intersection.

2.4 Wetland Areas

There are no large wetland areas within the Route 9 corridor. Several minor or seasonal tributaries to the Fort River do cross the Route 9 corridor.

3.0 EXISTING LAND USE

3.1 Data Collection and Mapping

In order to assess land use and development trends along the Route 9 corridor, PVPC staff gathered data from assessors' records, realtors and "windshield surveys" of Route 9 properties. Data collected for all land parcels abutting Route 9 included:

- Ownership/Renter
- Size of parcel
- Structures
- Current use
- Zoning district
- Access /number of curb cuts
- Frontage
- Assessed value of land and buildings

This data has been compiled on a matrix of Route 9 land parcels.

A new Route 9 corridor base map has been prepared to illustrate all parcels abutting the highway. Using this base map, the following working maps have been developed at a scale of 1" = 500':

- Zoning
- Generalized Land Use - 1987
- Development Trends - 1984-1985
- Environmental Constraints
- Public Utilities
- Current and Future Development Potential

Several of these maps are shown, at reduced scale, on the following pages.

3.2 Existing Land Use and Employment

Two decades ago, the corridor was almost exclusively farmland. Now, all but 104 acres have been sold off and developed, or are no longer used for agriculture. Six farm or vacant parcels, totalling 104 acres and assessed at $1.5 million (with asking prices triple to this), are now for sale. None of the farms is in the Massachusetts Agricultural Preservation Restriction Program, making them vulnerable to even greater economic pressures than those which prompted other farmers to sell their land in the past.

In addition to active farmland, another 136 acres are vacant. None of the vacant or agricultural land is constrained from development by environmental factors such as wetlands or aquifer overlay district. These factors are important indicators of the extensive potential for increased future development in the Route 9 corridor.

The agricultural and other open parcels are virtually the only breaks in what is otherwise a closed-in, linear strip development. They not only provide spectacular views of working farmland, and vistas of the Holyoke Range, but also help to reduce traffic congestion and safety hazards.

A majority of the employment opportunities (67%) which exist in Hadley are in the area of retail or wholesale sales. These jobs are located almost exclusively within the Route 9 corridor. Eighty-one percent of these jobs are filled by out-of-town residents who commute to work in Hadley, thus adding to the traffic burdens carried by Route 9.

Analysis of collected data yielded the following "vital statistics" on land use and resulting employment and traffic impacts in the Route 9 corridor:

Table 1. **ROUTE 9 LAND USE INDEX**

Total number of land parcels abutting Route 9, Hadley section:		241
Number of retail businesses along Route 9: (total includes 86 establishments in Hampshire Mall and 18 in Mountain Farms Mall)		206
Number of medical or office buildings:		17
Number of residences:		85
Number of institutional buildings:		6
Number of vacant parcels:	with no buildings	44
	with buildings not in use	11
	total vacant parcels	55
Total number of acres abutting Route 9, Hadley:		765
Land use categories by acreage:		
	Vacant (136.6 w/no bldgs)	145.4
	Residential	144.9
	Agricultural	104
	Retail	348
	Institutional	24
	Medical/Offices	18.6
	Serv./Lodging	14.2
Average frontage per parcel:		160 feet
Average assessed value per acre:		$35,121
Total number of curb cuts on Route 9, Hadley:		213
Average number of curb cuts per parcel:		.95
Average number for residential use:		1.0
Average number for retail uses:		1.5
Total employment in Hadley (1985):		3,120
Total retail and wholesale employment in Hadley:		2,106
Number of Hadley residents who work in Hadley (1980)		587
Approximate number of out-of-town residents who commute to work in Hadley:		2,533

3.3 Land Use Patterns

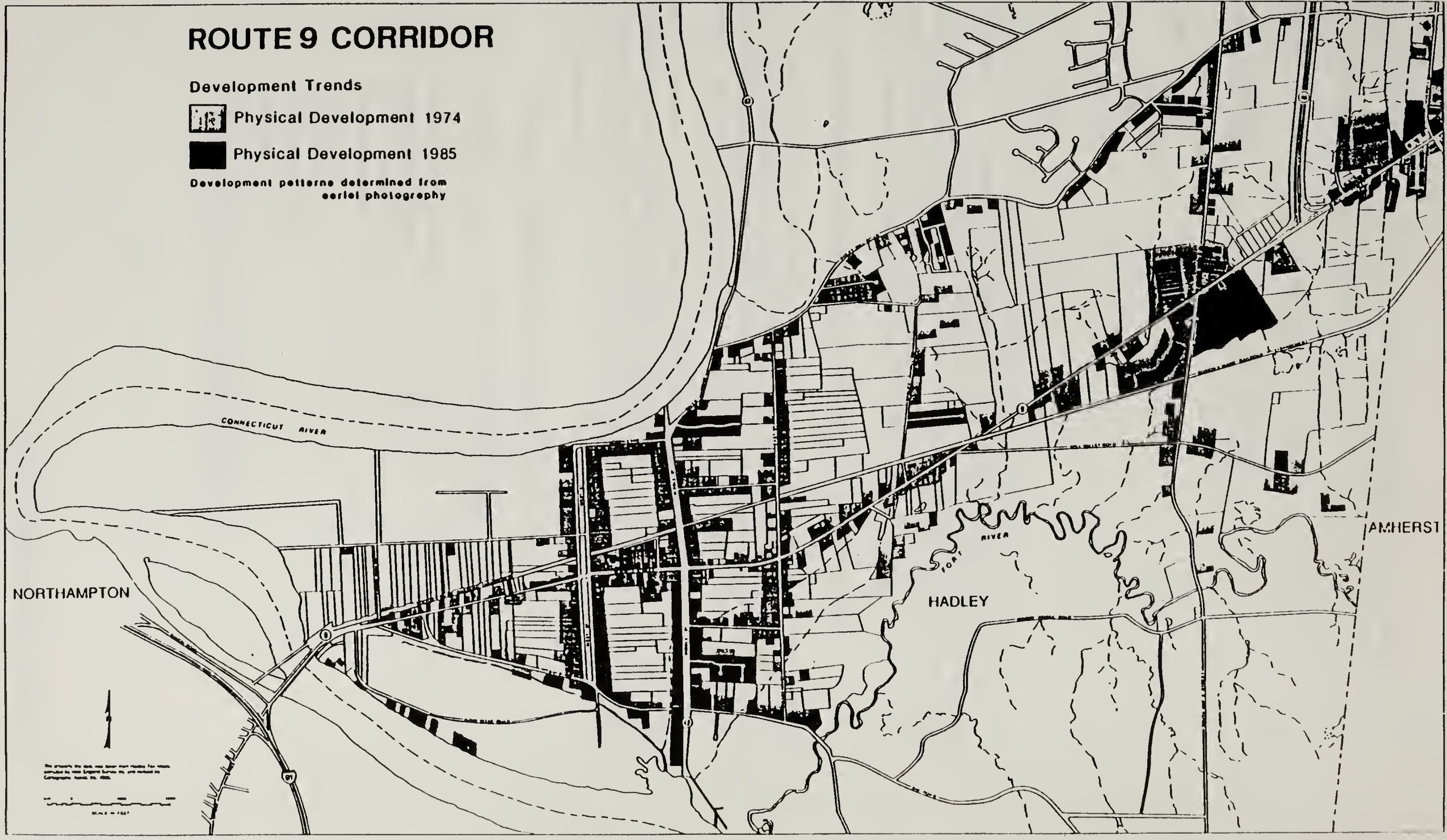
The predominant Route 9 corridor land use, both by acreage and by number of parcels, is retail business. Table 2 illustrates land ownership characteristics in the Route 9 corridor:

Table 2. **LAND OWNERSHIP CHARACTERISTICS**

Land Use	Number of land parcels
Retail	87
Residential	85
Vacant /not in use	61
Agriculture	13
Office	11
Services	10
Institutional	7
Medical	6
Misc.	3
TOTAL	297*

*NOTE:Some parcels have more than one use; thus the discrepancies between this total and the 241 total parcels in the corridor.

MAP 1


ROUTE 9 CORRIDOR
Development Trends
Physical Development 1974
Physical Development 1985
Development patterns determined from aerial photography
CONNECTICUT RIVER
FORT RIVER
NORTHAMPTON
HADLEY
AMHERST
91

The significant land acreage which is currently for sale in the Route 9 corridor portends important changes in both ownership and land use patterns. As of October 1987, twelve land parcels were for sale with characteristics shown in Table 3.

Table 3. **LAND FOR SALE IN ROUTE 9 CORRIDOR** (As of 10-88)

Current Use	No. of Parcels
Residential	5
Vacant	19
Agriculture	3
Retail	3
Lodging	1
TOTAL	31

Among the parcels for sale are three large farm parcels, totalling 60 acres and 1,570 feet of road frontage. The potential for commercial development of the 22 available agricultural or vacant parcels and then conversion of the five available residential parcels to commercial use could result in a significant increase in the number of businesses with direct access to Route 9. It should be noted that in the year since this survey was first conducted, the number of parcels for sale on Rt. 9 has almost tripled, from 12 to 31.

3.4 Business, Residential and Institutional Use Characteristics

There are a total of 206 retail businesses along Route 9 in Hadley with a total retail floor space of 1.5 million square feet. Of this floor space, over 200,000 square feet is vacant, the majority in Mountain Farms Mall. Virtually all of these businesses have direct access onto Route 9. For retail uses, there is an average of 1.5 curb cuts on Route 9 per parcel.

Retail uses can be described in greater detail. Not counting the two large retail malls, about 25 establishments are specialty or general retail stores. Another 22 are restaurants, ranging from quality to drive-in. There are 18 service stations or auto repair establishments, and 5 car dealerships. There are 4 furniture stores, 2 supermarkets, 3 convenience stores, and 2 hardware stores.

Table 4. **BREAKDOWN BY RETAIL TYPE**

Type of Retail	Approximate # Establishments
Specialty/general retail	25*
Restaurants, all type	22
Service station/auto repair	18
Car dealerships	5
Furniture	4
Supermarkets	2
Convenience stores	3
Hardware	2

*NOTE: This breakdown counts the Hampshire Mall and Mountain Farms Mall once each, as specialty/general retail.

3.5 Business Survey Results

A Business Survey was mailed out to the managers of all 210 businesses along the Route 9 corridor in Hadley. The purpose of the survey was to collect more detailed statistical data on business size, sales, employment, hours of operation, and expansion plans in order to gauge the impact of businesses on the Route 9 traffic situation. Additionally, the survey provided an opportunity for businesses to comment on the importance of PVTA bus service, and on overall Route 9 traffic conditions.

Responses to the survey were received from 52 businesses, a 25% response rate. Businesses of a wide range of types and sizes responded, including banks, retail stores, restaurants and insurance agencies. Many expressed hope that an effective solution to Route 9 problems could be found. A number of managers indicated that traffic delays do have a negative effect on their businesses.

The following represents a summary of key points from the business survey (note that these statistics only represent 25% of businesses):

Average business floor area: 5,240 square feet

Plans for business expansion: Eleven establishments indicated plans to expand in the next few years; 3 more were considering expansion.

Hours of operation: Opening hours were fairly evenly spread out through the morning on weekdays. Ten businesses opened at 8:00; 1 at 8:30; 6 at 9:00, and 3 at 9:30. The malls open at 10:00. Closing hours were more spread out. Seven stores closed between 4:00 and 6:00. Others were open until later in the evening, including the mall stores which close at 9:30.

Employment:

Full-time managerial employees	163
Part-Time managerial employees	14
Full-time non-managerial employees	156
Part-time non-managerial employees	311
TOTAL	644

Importance of PVTA bus service to businesses along Route 9:

Very Important	56%
Important	19%
Not Sure	10%
Not Very Important	13%
Unnecessary	0

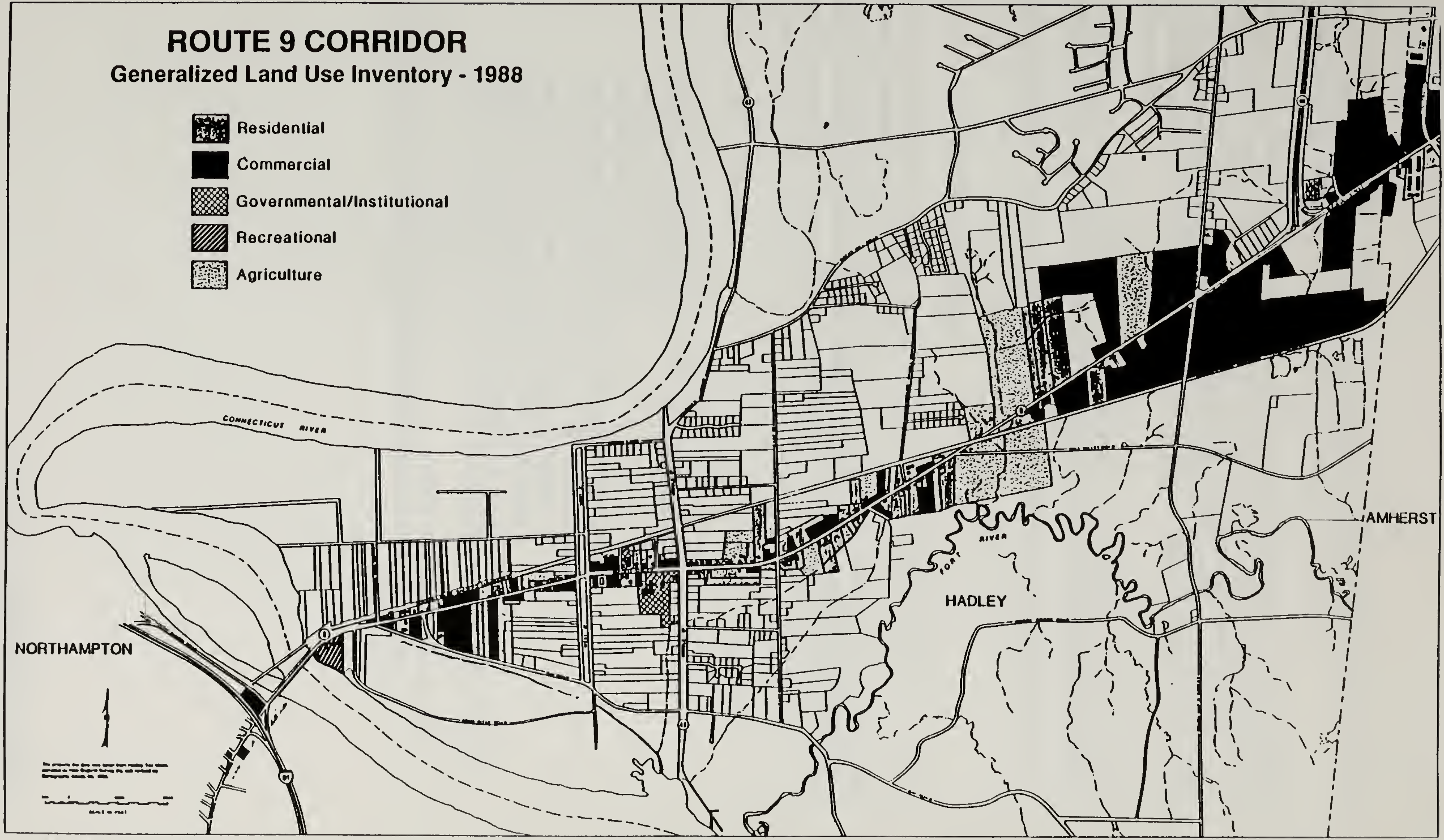
Reliance of respondents on PVTA to bring customers to door:

29%	Very much
24%	Somewhat
41%	Not at All

Comments on Route 9 Congestion Problems:

Business managers expressed much concern over congestion problems on Route 9 in Hadley, both in terms of personal inconvenience, and perceived effect on their business.

MAP 2



ROUTE 9 CORRIDOR

Generalized Land Use Inventory - 1988

Pioneer Valley Planning Commission, 1989

The alternating pattern between 2-lane and 4-lane stretches of road was mentioned by several as a cause of back-ups of cars. Congestion at the Coolidge Bridge is a major inconvenience, aggravated by back-ups after the Bay Road intersection.

One respondent noted that he avoids Route 9 at every opportunity; another described driving it at rush hour as "excruciatingly painful". Several felt that potential customers avoided the area as well, going elsewhere to shop to minimize inconvenience. The frequent long lines to turn left into the Hampshire Mall from Amherst, and long waits for buses and to turn out from driveways were mentioned as specific problems that drive customers away.

Two intersections came under fire as being particularly dangerous, including the East Street (Post Office) intersection and the Mountain Farms Mall entrance near Katina's.

The large number of untimed lights on the 4-lane stretch near Amherst was cited as a temptation to "squeeze" through them.

Suggestions for Improvement of Route 9

Business managers had a number of suggestions for improving the situation, in addition to comments about the traffic problems.
The most frequent suggestion was to widen the road to 4-lanes for the entire stretch, including the bridge (or build another bridge). Several others suggested expanding and promoting mass transit to decrease the number of cars on the road, rather than accommodating an increasing traffic volume.

Other suggestions included:

- expand the back roads
- create an alternate route to University of Massachusetts
- coordinate traffic lights
- stagger shifts at colleges
- station traffic officer at Damon Road during rush hours
- provide shuttle from University of Massachusetts to Mall
- provide more space for pedestrians/bicycles
- put barriers between east and westbound lanes
- reopen one-way access to Bay Road from the bridge
- direct I-91 traffic to University of Massachusetts via Sunderland Bridge.

Twenty-two respondents (49%) added comments - some a whole page worth. The issue is obviously of great concern to the business managers along the corridor.

4.0 ZONING REVIEW

4.1 Purpose of Zoning Review

Many growth factors, especially the expansion of the University of Massachusetts in Amherst, the construction of a regional mall in Hadley, and the revitalization of downtown Northampton, have contributed to the development of Route 9 in Hadley as a commercial corridor. The types, layout and appearance of buildings along the corridor can, in part, be attributed to the development regulations in place at the time of their construction. The purpose of this section is to examine current municipal zoning bylaws for Route 9 communities to determine what, if any, recommendations could be made to improve the design elements that will influence commercial development along Route 9. By increasing local controls over this development, the Route 9 communities can greatly reduce the problems associated with traditional strip development.

4.2 Existing Route 9 Zoning - Hadley

Hadley's zoning regulations for commercial development were adopted in 1978. Hadley has zoned virtually the entire Route 9 corridor from the Northampton town line to the Amherst town line for "Business" (see Map 3) The Business Zoning district generally extends a minimum of 500 feet on each side of Route 9. There are several locations where this width is exceeded. There are also two locations where the district is reduced in size: west of Bay Road, the width is 300 feet; and, at the Mill Valley Road intersection, the district is discontinued for 300 feet. A zoning map of the Route 9 corridor is shown on the following page.

Permitted uses within the Business district include the following:

- Office, bank, newspaper or job printing establishment
- Hotel, motel or restaurant
- Any wholesale or retail business, research laboratory, service or public utility
- Automobile service station, repair shop, storage garage or salesroom
- Detached one-family dwelling
- Religious, educational or municipal use
- Hospital, sanitarium, convalescent home
- Renting of rooms in a dwelling
- Farm or nursery stands and sales
- Agriculture, horticulture, floriculture.

In addition, the following uses may be allowed by Special Permit:

- Place of amusement or assembly, club conducted for profit
- Trailers or mobile homes
- Conversion of a one-family dwelling to a two-family
- Aviation field, golf course, boat livery, riding stable, ski tow
- Private club conducted not for profit
- Open-air movie theater.

The dimensional regulations in the Hadley zoning bylaw require that businesses erected in the Business district must have the following minimum lot dimensions:

- Lot size: 30,000 square feet
- Frontage: 175 feet
- Depth and Width: 150 feet
- Front yard: 50 feet
- Side yard: 15 feet
- Rear yard: 40 feet
- Maximum height: 2.5 stories/40 feet
- Maximum coverage: 30%

4.3 Existing Route 9 Zoning - Northampton

Northampton's zoning regulations for the Route 9 corridor establish a residential zone for most of the corridor's length (see Map 3). The exceptions are two zoned for business at the Damon Road intersection. Of these parcels, one is owned by the Mass. Department of Environmental Management, and thus will not be developed for business use, while the second parcel contains an existing restaurant.

Northampton has a standing policy not to consider re-zoning residential properties along Route 9, in order to protect the integrity of existing neighborhoods.

4.4 Existing Route 9 Zoning - Amherst

The Amherst section of Route 9 corridor is divided into three zoning districts: business, residential and professional research park (see Map 3). The northwest corner of the University Drive intersection with Route 9 contains seven parcels zoned for business. All of these parcels contain existing businesses. The northwest and southwest corners of the University Drive intersection are zoned for professional research park (PRP). Most of these land parcels contain existing businesses, an apartment complex, motel and medical center. One large open tract of PRP land remains. The southwest corner of the University Drive intersection. Most of this zone contains existing residences.

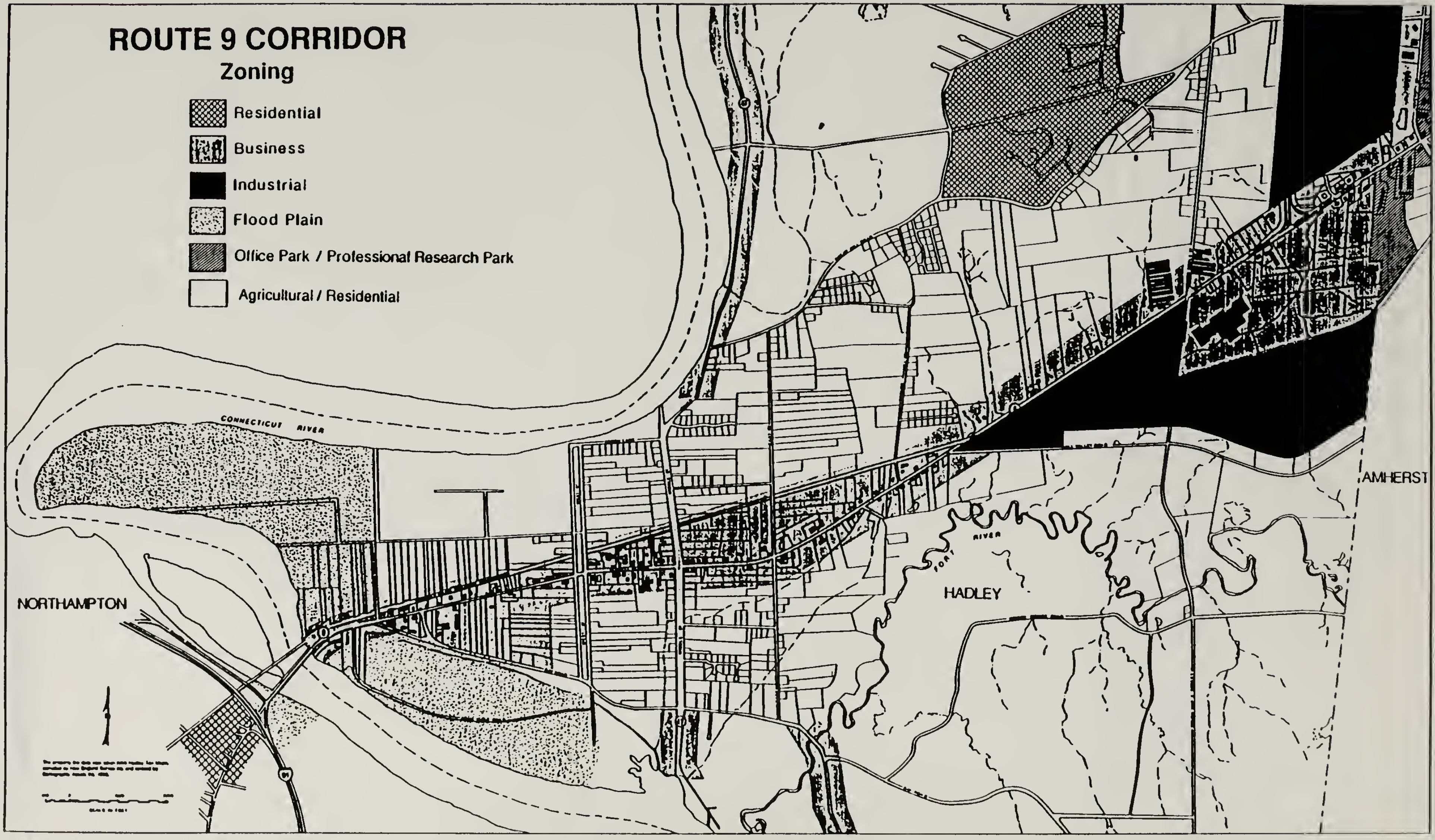
4.5 Problem Areas in Existing Zoning Bylaws

Hadley's existing zoning bylaw contains very limited regulations for parking, signage and site plan review. There are currently no regulations dealing with commercial landscaping, design, site layout, curb cuts or highway access control, screening or visual buffers, or performance standards for lighting, noise, storm water runoff, or erosion control.

The existing zoning bylaw has resulted in a somewhat haphazard, uncontrolled form of commercial strip development occurring along the length of the Route 9 corridor. Based upon a thorough review of development which has occurred along Route 9, the following problems can be traced to the zoning bylaw or zoning enforcement:

- Over-sized, unattractive signage
- Proliferation of temporary signs
- Building designs not in keeping with town character
- No unifying design theme for business development
- Lack of coherent landscaping
- Lack of screening for unsightly uses
- Uncontrolled curb cuts
- Vehicular access and safety problems
- Poor pedestrian and bicycle access

MAP 3



Pioneer Valley Planning Commission, 1989

- Parking location, size and design problems
- Poor site layout
- Traffic circulation problems within sites
- Lack of open space to create breaks in strip development
- Lack of efforts to preserve key scenic areas or prime farmlands
- Need for well-conceptualized density regulations
- Need to require only one principal use per lot.

Providing a more attractive, safe, well-planned business district in Hadley will benefit not only Town residents and casual passers-by, it will benefit businesses by establishing a better, more attractive environment in which to do business. Many of these problems can be resolved at the community level through improved zoning regulation and enforcement, land acquisition and other local actions. These solutions will be the focus of Section 9.

5.0 DEVELOPMENT CONSTRAINTS AND INCENTIVES

5.1 Land Availability and Cost

As previously discussed, there are currently 76 vacant or agricultural, commercially-zoned land parcels totalling 325 acres immediately adjacent to Route 9 in Hadley. These parcels have a very high potential for conversion to commercial use. In addition, there are 85 residences on 145 acres, virtually all of which are zoned commercial, making them suitable for conversion to businesses, a trend which has already begun. Clearly, from a land and zoning perspective, Route 9 is ripe for a potentially huge influx of commercial development with the associated burdens on infrastructure such as sewer, water and the highway itself. Perhaps the only factors preventing such a development boom are land prices and lack of commercial demand.

Land prices being asked by owners along Route 9 average three times the assessed value of parcels. Yet, a number of parcels have sold in the past year, so apparently these high land prices are not a significant deterrent.

5.2 Public Utilities

The entire Route 9 corridor is served by public sewer and water systems.

In Hadley, the sewer system servicing Route 9 comprises a collection system, 3 pumping stations, and a recently expanded waste water treatment plant (WWTP). A 1986 report by Almer Huntley Associates stated that, "At the present time, no additional flows can be permitted to enter the system due to the inadequacy of the existing sanitary system and the treatment plant".

The recently upgraded Hadley WWTP expands the system's capacity by 100,000 gallons per day (g/d). The currently proposed subdivisions in Hadley are calculated to add 98,800 g/d to the system, thus bringing the projected flow to the limit of the upgraded facility's capabilities.

One of the pumping stations at Mill Valley Road is being upgraded, but the flow will already be at design capacity (it is currently overextended).

A significant portion of the flow is infiltration and inflow (I/I). This is excess, unintended flow into the system from such sources as groundwater coming through cracks in pipes, roof drains that empty into the sewers instead of the yard, etc. Hadley is attempting to bring this problem under control. If the program is successful, it could free up a substantial amount of capacity within the sewer system.

The capacity of the water system is also of concern. According to a Huntley engineer who is familiar with the system, it is virtually at capacity now, and in times of drought, is severely taxed. Hadley is currently relying on the Mount Warner wells. A new well, the Callahan Well on Bay Road, was installed about 10 years ago. The Callahan Well's water is very high in manganese, however, which will require expensive treatment to make it potable, and bring the well on-line.

5.3 Environmental Constraints and Zoning Restrictions

The Route 9 corridor contains very few environmental constraints to development. There are no significant wetland areas adjacent to Route 9. Hadley's Aquifer Protection zoning district abuts the southern edge of Route 9 near Spruce Hill Road. This zoning district restricts but does not prevent the development of most business types, with the exception of gas stations, auto repair shops, trucking and bus terminals, and businesses generating hazardous wastes which are prohibited.

A significant section of the western end of Route 9 in Hadley lies in the 100-year floodplain of the Connecticut River. Hadley's floodplain zoning bylaw, however, establishes only minimal restrictions or prohibitions of uses within the floodplain. An updated bylaw is under development by the Hadley Growth Management Committee.

5.4 Summary of Development Constraints and Incentives

The Route 9 corridor in Hadley has available a large supply of vacant or developable land. Development is not significantly restricted by environmental constraints or local zoning restrictions. The principal current constraint to development is the Town's capacity to provide water and sewerage treatment. Combined with the anticipated influx of residential development in Hadley, increased commercial development along Route 9 could greatly overburden the Town's infrastructure, including water supply, sewerage treatment and the traffic-bearing capacity of Route 9 itself. Although there is sufficient vacant commercial space to accommodate anticipated commercial needs in Mountain Farms Mall and elsewhere along Route 9, open lands continue to be developed. This trend is being caused by the increasingly auto-oriented businesses which are locating on Route 9 and are changing the character of the corridor to a traditional "commercial strip".

6.0 ROUTE 9 BUILD OUT ANALYSIS

6.1 Purpose of Build-out Analysis

In order to quantify the potential impact that further commercial growth would have on Route 9, a series of "build-out" scenarios was completed for the corridor. The purpose of developing these build-out scenarios is to paint a series of pictures illustrating what Route 9 could look like in the future, in order to promote discussion of, and planning toward, the development option preferred by Hadley residents and officials. The scenarios are illustrated in detail in Table 5, and describe the anticipated number of new businesses and resulting traffic impacts on Route 9 in the years 2000 and 2010. The development options are based upon four growth scenarios:

Scenario #1: *Worst Case* - growth based on the 2-year average of number of building permits issued per year (5.5) and existing zoning. Assumes all new businesses are auto-oriented businesses which generate high volumes of traffic.

Scenario #2: *Likely Case* - based on the 5-year building permit average and existing zoning. Assumes a majority of new businesses will be auto-oriented.

Scenario #3: *Best Case* - based on 10-year building permit average (2.5) and changes in zoning which would restrict auto-oriented or high traffic-generating uses to limited areas, and require trip reduction planning.

Scenario #4: *Worst Case* - with zoning changes to reduce trip generation.

6.2 Procedures Used in Developing Build-out Scenarios

This section will lead you through Table 5 and explain the procedures used to develop the four build-out scenarios. Please refer to Table 5.

Column 1: **Building Permit Rates**, is simply the average number of building permits for new construction on Route 9 issued over the stated number of years.

Column 2: **Types of Business** were calculated as follows:

Auto-Oriented businesses included drive-in restaurants, convenience for stores, service stations, and banks.

Majority auto-oriented included the four business types above, plus insurance agencies and health clinics.

Lower Traffic Generators included insurance agencies, health clinics, motels, office buildings, hi-tech office buildings, and quality sit-down restaurants.

Column 3: **Number of new businesses by year 2000 / 2010:**

Column 1 average X # of years between 1988 and 2000/2010.
Example: 5.5 X 12/22 = 66/121

Column 4: **Current trips / day was derived by traffic counts by PVPC.**

Table 5. **ROUTE 9 BUILD-OUT SCENARIOS FOR YEARS 2000-2010**

	Annual New Building Permit Rate 1	Type of Business 2	Number of new businesses by Year 2000/2010 3	Current trips/ day 4	Net Number of New Trips Generated 2000/2010 5	Total Trips per day 2000/2010 6	Percent Increase 2000/2010 7	Year of Buildout 8
Scenario #1 Worst Case/ Existing Zoning	5.5 permits 2-year rate (1987-88)	All auto-oriented	66/121	30,000	25,840/47,370	55,840/77,379	86% / 158%	2012
Scenario #2 Likely Case/ Existing Zoning	3.2 permits 5-year rate (1983-88)	Majority auto-oriented	38/70	30,000	16,000/29,500	46,000/59,000	53% / 98%	2030
Scenario #3 Best Case/ Zoning Changes	2.5 permits 10-year rate (1978-88)	Lower traffic generators	30/55	30,000	3,270/5,990	33,270/35,990	11% / 20%	2042
Scenario #4 Worst Case/ Zoning changes and land acquisition	5.5 permits 2-year rate (1987-88)	Lower traffic generators	66/121	30,000	6,810/12,450	36,810/42,450	23% / 42%	2012

Column 5: **Net Number of New Trips Generated was derived as follows:**

Step 1: Trip generation rates for business types along Route 9 were calculated.

The information in Table 6 was taken from the TRIP GENERATION MANUAL by the Institute of Transportation Engineers. Studies conducted show the average number of trips that each type of business generates per day. A sampling of high, medium, and low traffic generators was used and the number of trips per day calculated.

A trip is defined as one vehicular movement to or from a destination. For example, a vehicle driving to a business and leaving the business is two trips.

Table 6. **TRIP GENERATION RATES FOR BUSINESS TYPES**

Type of Business	Average Weekday Vehicle Trips	Likely Average Size of Business	Trip Generation Rate / Day
1. Drive-in Rest.	769 per 1000 sq. ft.	2000 sq. ft.	1538
2. Convenience Food Store	427 per 1000 sq. ft.	2000 sq. ft.	854
3. Service Station	748 per Station	1 station	748
4. Bank	169 per 1000 sq. ft.	2000 sq. ft.	338
5. Insurance	11.5		11.5
6. Health Clinic	23.8 per 1000 sq. ft.	5000 sq. ft.	119
7. Motel	8.7 per unit	20 units	174
8. Office Building	12.43 per 1000 sq. ft.	5000 sq. ft.	62
9. Hi-Tech Building	7.28 per 1000 sq. ft.	5000 sq. ft.	36.4
10. Quality Sit-Down Rest.	97 per 1000 sq. ft.	3000 sq. ft.	291

Source: Institute for Transportation Engineers, TRIP GENERATION.

Step 2: The gross number of trips expected to be generated under each build-out scenario was calculated. This gross number was derived by multiplying the average trip generation rate per business by the projected number of new businesses anticipated in years 2000 and 2010. See Table 7. An example is given below:

Scenario #1: Worst Case: Businesses #1-4 from Table 6 are high traffic generators. The trips/day of these four were averaged (870 trips/ day/business). This number times the number of new businesses (66/121) gave the # of trips generated by these additional businesses by the years 2000 and 2010.

Table 7. **GROSS NUMBER OF TRIPS GENERATED**

Build-out Scenario	Business types Anticipated (Nos from Table 6)	Average Trips/Day X Per Business	Projected No. of new businesses 2000/2010	Gross No. of Trips Generated
Scenario #1 Worst Case	1-4	870	66 /121	57,420 /105,270
Scenario #2 Likely Case	1-6	602	38 / 70	22,876 / 42,150
Scenario #3 Best Case	5-10	121	30 / 55	3,630 / 6,655
Scenario #4 Worst Case w/zoning changes	4-10	147	66 /121	9,729 / 17,787

Step 3: Accounting for diverted trips vs. new trips generated is important in order to accurately project the traffic impact of new business development. The gross number of trips generated, as shown in Table 7, is somewhat deceptive, however. Not all of these trips generated by new businesses are new trips. Some of the people going to these new businesses would have been driving on Rt. 9 anyway. Studies have shown there are 3 types of trips generated and that each type of business produces a different percentage of new trips.

1. Passerby trips: cars not going to business in question.
2. Diverted: cars going somewhere else, but go to business in question as well.
3. New trips: trips solely going to the new business.

Studies have shown that new trips comprise about 45% of trips to auto-oriented businesses, 70% of those to a mixture, and 90% of those to low traffic generators. Therefore, the number of trips generated multiplied by the appropriate percentage equals the net number of trips that are new (i.e. new traffic generated that would not otherwise have been there), as shown in Table 8 below.

Table 8. **NET NUMBER OF NEW TRIPS GENERATED**

Build-out Scenario	Gross No. of Trips Generated 2000/2010	Percent of Gross Trips which are New Trips	Net Number of New Trips Generated
Scenario #1: Worst Case	57,420 /105,270	45%	25,840 / 47,370
Scenario #2: Likely Case	22,876 / 42,150	70%	16,000 / 29,500
Scenario #3: Best Case	3,630 / 6,655	90%	3,270 / 5,990
Scenario #4: Worst Case w/Zoning changes	9,729 / 17,787	70%	6,810 /12,450

Column 6: Total trips is the sum of the current trips/day and the additional trips generated by 2000/2010.

Column 7: Percent increase 2000/2010
This column shows the percent increase in traffic from 1988 to the years 2000 and 2010.

Column 8: The year of build-out takes the number of vacant or agricultural parcels adjacent to Route 9, the projected number of buildings on each, and given the respective building permit rates, calculates how long it would take to fill all the parcels. The year at which this "build-out" would occur is given.

6.3 Conclusions

The most dramatic result of the build-out scenarios shown in Table 5 can be seen by comparing Scenario #1 and Scenario #4. In the hypothetical worst case scenario, if the building permits continue to be issued at a high rate of 5.5 per year, with all new businesses being high volume traffic generators, and no new land use controls are instituted, Route 9 can expect an estimated 47,000 new trips by year 2010, or a 158% increase. However, if this high growth rate is complimented with a comprehensive package of new land use controls, the anticipated new trips on Route 9 could be reached to an estimated 12,000, or a 42% increase over the present.

Clearly, the worst case scenario is not an acceptable option. With Route 9 traffic conditions already approaching gridlock at peak hours, a 158% increase in traffic would result in extreme travel time delays, a proportionate increase in accidents, frustration on the part of motorists, and loss of clientele for Route 9 businesses.

Footnote: The build-out scenarios in Section 6.0 illustrate hypothetical future conditions. Section 7.0 contains an assessment of the anticipated traffic impacts from actual Route 9 business projects which have been constructed since 1987, or received or applied for permits. This assessment shows that actual traffic impacts may, in fact, exceed the "worst case" hypothetical scenario presented in Section 6.0.

7.0 CURRENT DEVELOPMENT TRENDS AND ESTIMATED TRAFFIC IMPACTS

7.1 Route 9 Development Trends

During the period 1971-1986, development in the Route 9 corridor in Hadley proceeded at a relatively slow but steady pace. Permits for expansions and remodeling greatly outnumbered new construction during this period as shown in Table 9. Between 1987 - 1990, the rate of development on Route 9 increased for new construction, as discussed in more detail in Section 7.2. Hadley's total commercial acreage doubled between 1971 and 1985 (see Section 7.6).

Table 9: **BUILDING PERMITS ISSUED IN THE ROUTE 9 CORRIDOR, HADLEY**

Year	New Construction Permits	Remodel/Expansion Permits
1983	2	7
1984	2	10
1985	3	20
1986	3	9
1987	5	17
1988	4	2
1989	6	3

7.2 Route 9 Development 1987-1990

During the four-year period 1987-1990, the Route 9 corridor experienced a surge of new construction and development applications largely for commercial projects. As of January, 1990, thirty-two new businesses or business complexes totalling an estimated 1.2 million square feet of floor space had been constructed since 1987, or had applied for development permits in the corridor (between the Coolidge Bridge and University Drive, Amherst). Thirty of these new projects are located in Hadley, while one is located in Amherst, and one in both towns. These new uses include two office complexes, a 78-acre industrial/office park, two retail shopping complexes, two apartment complexes, two medical centers, two fast-food restaurants, and four auto service/gas station businesses. These are summarized in Table 10 below, and shown in detail on Table 11 and Map # 4.

Table 10. **DEVELOPMENT TRENDS - ROUTE 9 CORRIDOR (1987-1990)**

Type	Total No. of Projects	Total Floor Space	Percent of Total Floor Space
New Business Projects - Construction Complete/or Underway	13	182,390 sq.ft.	16%
New Business/Residential Projects Or Permits Approved or Pending	12	950,200 sq.ft.	81%
Business Expansion/Renovation Projects (Complete or Underway)	7	35,600 sq.ft	3%
TOTALS	32	1,168,190 sq.ft.	100%

Table 11. ROUTE 9 COMPLETED AND PROPOSED PROJECTS 1987-1990

	NAME	DEVELOPMENT TYPE	TOWN	SIZE OF BUILDINGS (sq. ft)	STATUS (JANUARY 1990)
1.	Hadley Crossing (Kauffman)	Medical Offices	Hadley	15,000	Construction Completed 1988
2.	Holy Rosary Parish Center	Church	Hadley	7,254	Construction Completed 1988
3.	Long Radio	Auto Stereo Sales	Hadley	2,500 est.	Construction Completed 1987
4.	Brassmith	Retail	Hadley	3,000 est.	Expansion Completed
5.	WMECO Service Center	Service/Maintenance	Hadley	45,000	Construction Completed 1987
6.	Hadley Car Wash	Service/Car Wash/Gas Station	Hadley	5,000	Site Plan Approved
7.	Medical Office Building	Medical Offices	Hadley	8,836	Contruction Completed 1987
8.	Russell Street Commons	Retail Center/Motel Offices	Hadley	54,000	ENF Submitted
9.	Stuff-it Storage	Self Storage	Hadley	16,000	Construction Completed 1989
10.	Langley Ford	Light Industrial	Hadley	25,000	Site Plan Approved
11.	Flower Time	Retail Garden Center	Hadley	15,930	Construction Completed 1988
12.	Route 9 Commercial Condo	Office/Retail Center	Hadley	18,000	Site Plan Approved
13.	Performance Motoring	Auto Service	Hadley	7,000	Addition Approved
14.	Jiffy Lube	Auto Service	Hadley	2,900	Construction Completed
15.	Dunkin Donuts	Fast Food	Hadley	1,800	Site Plan Submitted
16.	Ski Haus	Retail	Hadley	2,500	Addition Completed 1989
17.	West Mass Business Park	Office Park	Hadley	400,000	Zone Change Approved
18.	B & S Glass (Four Stores)	Retail	Hadley	8,000	Construction Completed 1989
19.	West Gate Center	Office Complex	Hadley	120,000	Site Plan Approved
20.	Campus Plaza South	Retail/Office	Hadley	20,000	Site Plan Approved
21.	Wildwater Outfitters	Retail	Hadley	4,300	Renovation Completed 1989
22.	Kentucky Fried Chicken	Fast Food	Hadley	2,650	Construction Completed 1989
23.	Stop & Shop (Addition)	Retail Center	Hadley	45,000	Site Plan Submitted
24.	Windfield Park	Apartments (252 units)	Hadley	200,000	ENF Submitted
25.	Greenleaves At Amherst	Apartments (210 units)	Amherst	60,000	ENF Submitted
26.	Marina/Floor Covering Shop	Retail Boat Sale	Hadley	6,240	Construction Completed 1988
27.	F.L. Roberts (Additions)	Retail	Amherst/Hadley	2,080	Construction Underway 1990
28.	Gleason Brothers	Warehouse/Storage	Hadley	50,000 est.	Construction Completed
29.	Portland Glass	Retail/Service	Hadley	3,800	Renovation Completed 1989
30.	Carpet Showcase	Retail/Service	Hadley	5,000 est.	Addition Completed
31.	Validata	Office/Production	Hadley	10,000	Remodel Completed 1989
32.	Hollrock Engineering	Miniature Golf Course	Hadley	1,400	Bldg. Permit Approved 1989
	TOTAL			1,168,190	

Table 12. **ESTIMATED TRAFFIC GENERATION - ROUTE 9 COMPLETED AND PROPOSED PROJECTS 1987-1990**

	Name	Primary and Pass-by Trips Generated	Weekday P.M. Peak Hour Volume	Estimated Primary or Diverted Trips	Primary or Diverted Trips	PM Peak Hour Primary or Diverted Trips	Pass-by Trips	ITE Land Use Code Method
1.	Hadley Crossing (Kauffman)	395	49	95%	375	47	5%	720 (FCE)
2.	Holy Rosary Parish Center		*			*		(FCE)
3.	Long Radio	71	*	75%	53	*	25%	814 (FCE)
4.	Brassmith	140 (1,800)*	14 (215)*	60%	84 (996)*	8 (120)*	40%	810 (R)
5.	WMECO Service Center	219	27	80%	175	22	20%	150 (FCE)
6.	Hadley Car Wash	748	31	40%	299	12	60%	844 (R)
7.	Medical Office Build.	211	28	95%	200	27	5%	720 (FCE)
8.	Russell Street Commons	3,184	348	55%	1,751	191	45%	820/320 (FCE/R)
9.	Stuff-it Storage	29	3	85%	377	3	15%	150 (R)
10.	Langley Ford	224	43	80%	179	34	20%	110 (FCE)
11.	Flower Time	398	45	60%	239	27	40%	817 (FCE)
12.	Route 9 Commercial Condo	260	56	70%	11	39	30%	750 (FCE)
13.	Performance Motoring	748	*	75%	13	*	25%	844 (R)
14.	Jiffy Lube	748	*	75%	561	*	25%	844 (R)
15.	Dunkin Donuts	1,399	936	48%	672	449	52%	833 (R)
16.	Ski Haus	71	*	70%	50	*	30%	814 (FCE)
17.	West Mass Business Park	4,495	535	75%	3,371	*	25%	750 (FCE)
18.	B & S Glass (Four Stores)	*	280	60%	*	168	40%	814 (FCE)
19.	West Gate Center	1,477	221	75%	1,108	166	25%	750 (FCE)
20.	Campus Plaza South	2,600	269	70%	1,820	188	30%	820 (FCE)
21.	Wildwater Outfitters	124 (1,004)*	24 (222)*	60%	74 (528)*	14 (118)*	40%	810 (R)
22.	Kentucky Fried Chicken	1,637	86	55%	900	47	45%	834 (FCE)
23.	Stop & Shop (Additions)	4,403	410	60%	2,642	246	40%	820 (FCE)
24.	Windfield Park	1,537	177	75%	1,153	133	25%	220 (R)
25.	Greenleaves At Amherst	1,281	147	75%	961	110	25%	220 (R/FCE)
26.	Marina/Floor Covering Shop	470	54	80%	376	43	20%	420/814 (R/FCE)
27.	F.L. Roberts (Additions)	2,661	213	38%	1,011	81	62%	851 (R)
28.	Gleason Brothers	244	30	80%	195	24	20%	150 (R)
29.	Portland Glass	87	*	75%	65	8	25%	814 (FCE)
30.	Carpet Showcase	155	*	75%	116	*	25%	814 (FCE)
31.	Validata	98	15	85%	83	*	15%	760 (FCE)
32.	Hollrock Engineering	82	*	95%	78	*	5%	430 (R)
GROSS TOTAL TRIPS GENERATED		32,926	3,863		20,391	2,370		
NET TOTAL TRIPS GENERATED*		30,122	3,426		18,867	2,132		

* Reflects net increase or decrease in trips generated by new use, after subtracting trips generated by former use(s).

NOTES: Calculations were done using the following methods: Fitted Curve Equations (FCE) and Rate (R) Methods.

Trips are broken down into three categories, Primary Diverted and Pass-by Trips. They are also defined by the Institute of Transportation Engineers accordingly.

PRIMARY TRIPS: A primary trip destined to a retail facility is one in which the purpose of the trip is shopping and the trip pattern is generally home-to-shopping-to-home.

DIVERTED TRIPS: A diverted trip is one in which the shopping destination is secondary part of the primary trip, such as work-to-shopping-to-home. The diverted trip involves a route deversion from one roadway to another, for example, to reach a retail facility.

PASS-BY: The pass-by trip comes directly from the traffic stream passing the facility on the adjacent street system and does not require a diversion from another roadway.

7.3 Projected Traffic Impacts of Route 9 Development 1987-1990

The traffic impacts on Route 9 of the thirty-two new businesses, business complexes, or residential complexes completed or proposed in the Route 9 corridor during 1987-1990 are projected in Table 12. These new projects are anticipated to generate a gross increase of 30,122 trips on Route 9. However, since some of these trips will result from traffic already on Route 9, the number of primary or diverted trips was also projected. It is anticipated that a net increase of 18,867 primary or diverted trips (new traffic not already on Route 9) will result from these projects. This would be a 60% increase over 1987 traffic levels on Route 9.

The full impact of the developments on Route 9 traffic volumes will probably not be felt for 5-10 years. Only about 63% of the above-noted businesses and about 19% of the proposed new commercial floor space had been constructed as of January 1, 1990. Many of the proposed new projects are medium to large scale projects which are planned to be constructed on phased basis over a number of years.

7.4 Projected Traffic Impacts of Route 9 Development 1990-2010

Based upon actual annual rates of new construction, and estimated trip generation per business for businesses constructed or permitted in the Route 9 corridor during 1987-1990, it is possible to project, with a higher degree of certainty, the traffic impacts of future development in the Route 9 corridor (see Table 13).

Table 13. **PROJECTED TRAFFIC IMPACTS OF ROUTE 9 DEVELOPMENT 1990-2010.**

Year	New Businesses Constructed Since 1990*	Average Primary or Diverted Trips / Business +	Total New Primary or Diverted Trips
2000	3.6 / year = 36 total	699	25,164
2010	3.6 / year = 72 total	699	50,238

* Based upon building permit trends in Hadley 1983-1989 (see Table 9)

+ Based upon estimated trip generation rates for 21 new businesses constructed or permitted in Hadley 1987-1990 (see Table 12), not including WestMass Business Park, or additions/renovations to existing business.

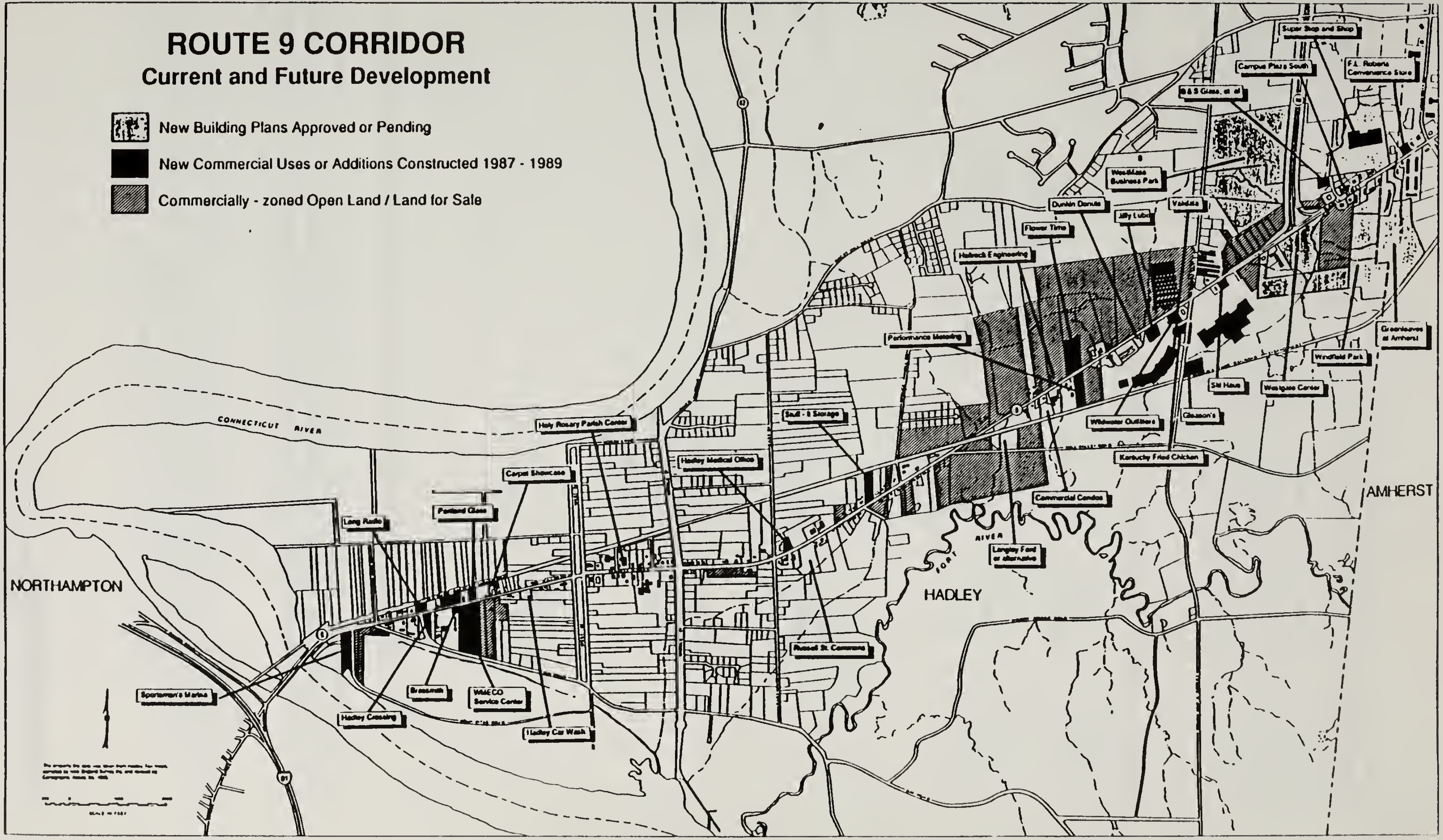
It is anticipated that some of the total new primary or diverted trips shown in Table 13 will be generated by businesses shown in Tables 11 and 12, applied for or received site plan approval, but have not yet received building permits or initiated construction.

7.5 Planned Development at the University of Massachusetts

The University of Massachusetts at Amherst currently has three major facility construction projects planned which will affect traffic in the Route 9 corridor. These projects are summarized in Table 14 below.

The traffic impact of these projects on Route 9 cannot be fully evaluated at this time. The University has not undertaken traffic studies for either the new Engineering or Polymer Science Buildings, since budget problems have made it difficult to determine whether these facilities will house any new staff or simply existing staff.

MAP 4



ROUTE 9 CORRIDOR

Current and Future Development

- ▨ New Building Plans Approved or Pending
- ■ New Commercial Uses or Additions Constructed 1987 - 1989
- ▨ Commercially - zoned Open Land / Land for Sale

Pioneer Valley Planning Commission, 1989

The University did complete a traffic study for the new Mullin Arena. This study concluded that, at maximum seating capacity of 11,500 spectators, the arena will generate approximately 2,565 vehicle trips during the one-hour period following an arena event. Of these trips, 71.5 percent are expected to use Commonwealth Avenue to destinations west and south of the campus area. Although the study did not directly evaluate Route 9 traffic impacts, it can be assumed that a significant portion of the 71.5%, or 1834 vehicle trips, will travel via Route 9. The University study proposed traffic mitigation measures for on-campus locations, but did not propose such measures for Route 9.

Table 14. **FACILITY CONSTRUCTION PROJECTS PLANNED AT UNIVERSITY OF MASSACHUSETTS**

Facility Name	Facility Size (Total Gross Sq. Ft.)	Status	New Employees	Daily Trips Generated
University-Mullin Convocation Center / Arena	245,000 sq. ft. 11,500 seat indoor arena	Construction to begin 1991 to be completed 1993 - 1994	i.n.a.	2,565 per event
University-Engineering Research Building	36,000 sq. ft.	Under Construction; done in 1991	Primarily Existing facility	i.n.a.
University-Polymer Science Building	162,000 sq. ft.	Design to be complete 1990; construction completed 1993-1994	Primarily Existing facility	i.n.a.
Federal - U.S. Fish & Wildlife Service	i.n.a.	planned near campus	est. 200	i.n.a.

i.n.a. - information not available

7.6 Current Development Trends Outside the Route 9 Corridor

During the period 1971-85, approximately 1428 acres of land were developed for residential, commercial and industrial use in Amherst, Northampton and Hadley as shown in Table 15. This development activity has undoubtedly generated increased traffic along Route 9 as new residents commute to new jobs and shopping.

Between 1971 and 1985, Hadley's total acreage in commercial use doubled, increasing by 76 acres, or more than Northampton and Amherst's combined commercial acreage increase for the same period. Hadley is now the second largest commercial center in Hampshire County, behind only Northampton in total commercial acreage.

Table 15. **LAND USE CHANGE IN ROUTE 9 CORRIDOR 1971-1985**

	RESIDENTIAL		COMMERCIAL		INDUSTRIAL	
	Change in Acres	Percent of Change	Change in Acres	Percent of Change	Change in Acres	Percent of Change
Hadley	+ 199	18.3	+ 76	50.9	+ 21	43.3
Northampton	+ 433	14.5	+ 37	10.6	+ 37	32.0
Amherst	+ 552	20.1	+ 29	16.0	+ 44	45.1
TOTALS	+1184		+142		+102	

In Hadley, the Planning Board is currently reviewing eleven preliminary subdivision plans that would result in the development of 375 new housing units. The largest of the proposed subdivisions, Young Meadow Horse Farm, would result in 230 new homes located just outside the Route 9 corridor of North Maple Street in Hadley.

8.0 ALTERNATIVE LAND USE STRATEGIES

All across the United States, communities are struggling with a common problem: controlling the traffic and aesthetic impacts of commercial strip development. Clearly, there is no simple solution, but communities have been successful in combining various elements of traffic, access and development management into multi-faceted commercial corridor programs.

In developing a series of recommended land use strategies, PVPC investigated a wide range of alternatives. Many of these alternatives are based upon the strategies and experiences of communities across the United States in controlling traffic volumes and commercial strip development along highway corridors. Other alternatives are more conceptual, and are linked to the unique problems and opportunities presented by the Route 9 corridor.

The complete package of options is contained in the following section, in Table 16, "Alternative Land Use Strategies".

Table 16. ALTERNATIVE LAND USE STRATEGIES

ISSUE	GOAL	STRATEGIES / OPTIONS	EXAMPLE (Bylaw or Policy Implemented)
• Controlling Traffic Impacts	• Reduce traffic generation by controlling form and type of development. • Encourage clustering of businesses to minimize curb cuts.	• COMMERCIAL CORRIDOR SITE PLAN APPROVAL - Establish a commercial corridor overlay zone requiring Site plan approval for all non-residential uses. Approval criteria can be designed to promote planned unit or clustered business developments: - Require developer to demonstrate that proposed project will minimize traffic impacts by using - single driveways or cul-de-sac roads for multiple businesses - Require traffic impact statement for large developments describing measures necessary to preserve traffic-bearing capacity of roads - Require that open space preservation be maximized - Encourage the concentration of complimentary uses	Canton, Massachusetts Citrus County, Florida Loudon County, Virginia Savannah, Georgia Westport, Connecticut El Sequndo, California Austin, Texas
	• Reduce traffic impacts of new development.	• TRIP REDUCTION ZONING - Require development of strategies designed to reduce traffic impact of a proposed project	Cambridge, Massachusetts Chapel Hill, North Carolina
	• Reduce traffic volumes • Link commercial development to on-site housing.	• PLANNED UNIT DEVELOPMENT - Establish use intensity regulations (floor area ratios) - Create incentives for or require on-site housing - Require on-site and off-site transportation improvements	Reading, Massachusetts Santa Monica, California Sacramento County, California
• Controlling Types of Uses	• Limit business uses to those which generate lower traffic volumes.	• PROHIBIT OR RESTRICT HIGH TRAFFIC GENERATING USES Prohibit or restrict uses which generate highest volumes traffic, including fast-food restaurants, supermarkets, of large shopping center, large office buildings, gas stations, convenience stores	Fairfax County, Virginia
		• DOWNZONING OR RE-ZONING Re-zone highway prperties to a less intensive use or increase lot sizes	
• Controlling Location of Uses	• Focus high intensity uses at appropriate locations.	• DIVIDE COMMERCIAL CORRIDOR INTO MULTIPLE DISTRICTS - Establish seperate districts for high intensity and lower intensity commercial uses - Provide option for transfer of development nights - Restrict high intensity uses to nodes or clusters, such as major intersections	Carlsbad, Calfiornia York, Maine

Table 16. **ALTERNATIVE LAND USE STRATEGIES (continued)**

ISSUE	GOAL	STRATEGIES / OPTIONS	EXAMPLE (Bylaw or Policy Implemented)
• Conversion of Residences to Business Use	• Control conversion of existing residences to business.	• RESIDENTIAL CONVERSION BYLAW - Establish increased minimum lot sizes for business uses, and provisions for change of use from residential to commercial - Restrict construction to one principal building per lot.	Taunton, MA
		• RE-ZONING - Zone existing residential areas for residential rather than commercial, use	
• Access Control	• Limit curb cuts to improve highway safety.	• COMPREHENSIVE ACCESS CONTROL POLICY - Establish new MDPW curb cut permit policy for new businesses or change of use in existing residential or business uses, requiring: Correction of existing access problems	
		Require minimum distance between curb cuts Require minimum curb cut distance from intersections Require new uses to integrate access, circulation and parking with adjoining properties Limit curb cuts to one per business, except in special circumstances	Savannah, Georgia
		Require access on side roads, or frontage roads, if available	Granby, Massachusetts
		Circulation to be designed so that internal access will minimize need for frequent use of arterial highway. Frontage or loop roads, common driveways to be encouraged.	Savannah, Georgia
	• Elminate uncontrolled access.	• INSTALL VERTICAL CURBS - Install vertical curbs on entire length of right-of-way	New Orleans, Louisiana
• Inter-governmental Coordination	• Coordinate efforts of involved municipalities, state agencies institutions to control traffic volumes.	• INTERGOVERNMENTAL MEMORANDUM OF AGREEMENT - Promote coordinate zoning controls, establish an inter-municipal development review process for large-scale commercial project, and pursue other cooperative traffic reduction measures, such as variable work hours, carpool/vanpool options, ridesharing.	Five communities in Grand Rapids, Michigan metro area
• Growth Rate	• Phase in traffic impacts of commercial growth over time.	• PHASED GROWTH BYLAW - Establish annual limit on commercial building permits, linked to highway capacity	Hadley, Amherst, Massachusetts
	• Temporary relief from commercial growth until highway improvements are made.	• TEMPORARY GROWTH MORATORIA - Can be imposed via: local bylaw; sewer connection permit limit; or by MDPW curb cut moratoria	Easthampton, Amherst, Massachusetts

Table 16. **ALTERNATIVE LAND USE STRATEGIES (continued)**

ISSUE	GOAL	STRATEGIES / OPTIONS	EXAMPLE (Bylaw or Policy Implemented)
• Density Control	• Reduce traffic generation	- Increase minimum lot size for businesses uses (i.e. 60,000 s.f.) - Increase frontage requirements	Rehoboth, Seekonk, MA
	• Encourage consolidation of land parcels • Encourage clustering of businesses	- Allow reduced lot sizes and frontage requirements through planned unit development, via Special Permit	
• Open Space Preservation	• Preserve "green spaces" between business districts to promote highway safety and clustering of business uses.	• LAND ACQUISITION: - Apply for MDPW grant funds to purchase selected land parcels	Gloucester, Beverly, MA
		• LOCAL LAND BANK - Establish local fund to enable exercising of Chapter 61a right of first refusal	
		• TRANSFER OF DEVELOPMENT RIGHTS - Allow for transfer of development rights to increase density, preserve open lands	Sunderland, Massachusetts
• Sign Control	• Control signs to protect community character, enhance traffic safety.	• SIGN ORDINANCE - Establish new sign ordinance: - Limit number of signs per business	
		- Limit sign size, based upon size of building	New Orleans, Louisiana
		- Establish standards for sign materials, light placement - Limit sign information to business name, address	
		- Establish maximum height	Boulder, Colorado
		- Ban temporary, free-standing signs	
		- Ban billboards	Montgomery County, Maryland
		- Require removal of non-conforming signs with 3 years	New Orleans, Louisiana
		- Provide for enforcement with system of tickets for offenders	Champaign, Illinois
• Design/ Appearance	• Control business appearance to protect community character; improve attractiveness of business.	• DESIGN REVIEW / APPEARANCE CONTROLS - Require design review as part of site plan approval process for all non-residential uses. Establish Design Review Board, and design standards for:	Boca Raton, Florida Amherst, Massachusetts Savannah, Georgia
		• Architectural design • Building materials and finish • Lanscaping and screening	
		- Establish appropriate setback requirements with no parking permited in required front yards	Granby, Massachusetts
	• Protect historic character of Hadley town center.	• HISTORIC DISTRICT ZONING - Establish tighter design controls for historic district than elsewhere in Route 9 corridor	

ISSUE	GOAL	STRATEGIES / OPTIONS	EXAMPLE (Bylaw or Policy Implemented)
• Landscaping	• Improve overall appearance of Route 9 corridor. Screen objectionable uses.	• ZONING STANDARDS FOR LANDSCAPING	
		- Establish landscaping standards for all non-uses, including:	Granby, MA
	• Provide uniform standards for development and maintenance of landscaping.	- Establish performance standards for landscaping elements	Pima County, AZ
		- Require landscaping of a minimum front yard area	Colorado Springs, Colorado
		- Require a buffer between commercial and residential area	
		- Require screening of loading areas, equipment, areas etc.	
		- Require landscaping for existing uses planning to expand by more than 25% of gross floor area	Pima County, Arizona New Hanover, North Carolina
		- Require maintenance of landscaping	
		- Control height and placement of exterior lights	
		• HIGHWAY BEAUTIFICATION	
		- Apply for state grant to undertake landscaping within Route 9 right-of-way. Establish local "beautification committee".	
• Parking	• Improve safety and aesthetics of parking areas.	• PARKING STANDARDS:	
		- Establish standards for parking including:	
		- Required number of spaces and dimensions	Granby, Massachusetts
		- Required landscaping to screen parking from street or residential uses	Colorado Springs, Colorado Pima County, Arizona
		- Parking to be located at side or rear of building	
		- Promote shared parking areas between adjacent business	
		- Restrict parking from front yard requirements	Colordo Springs, Colorado
		- Require interior traffic and pedestrian circulation plan for large developements	
		- Driveway standards designed to minimize traffic impacts	Rensselaer County, New York
		- Require data on drainage flow in site plan	
		- Establish off-street loading requirements	Pima County, Arizona
• Pedestrian/ Bicycle Access	• Promote pedestrian and bicycle access to business to reduce a need for driving to individual businesses.	• ZONING FOR PEDESTRIAN/BICYCLE ACCESS	
		- Promote clustering of businesses via site plan	
		- Require paved access routes to bikeway, if adjacent to right-of-way.	
		- Require sidewalks.	

Table 16. **ALTERNATIVE LAND USE STRATEGIES (continued)**

ISSUE	GOAL	STRATEGIES / OPTIONS	EXAMPLE (Bylaw or Policy Implemented)
• Costs/Financing	• Provide method of financing necessary infrastructure improvements in Route 9 Corridor.	• IMPACT FEES FOR TRIP GENERATION - Establish system of road impact fees, based upon amount of traffic generated by businesses, to pay for costs of public infrastructure improvements and town inspection services.	Seattle, Washington DuPage, Lake Counties, Illinois
• Public Information	• Promote effective use of zoning regulations.	• COMMERCIAL DESIGN MANUAL - Develop a design manual to explain regulations and standards, and provide examples of appropriate signs, landscaping, architectural design.	Pima County, Arizona Colorado Springs, Colorado
• Billboard Removal	• Improve safety and aesthetics.	• BILLBOARD AMORTIZATION AND REMOVAL - The Massachusetts Outdoor Advertising Board has authority to delicense billoards	

9.0 RECOMMENDED LAND USE STRATEGIES

It is apparent, based upon the traffic impacts of current development and the projected build-out scenario (Section 6.0), that Route 9 cannot sustain continued uncontrolled commercial growth without serious traffic problems. There are several compelling reasons why action to control land use impacts on Route 9 traffic is needed now. First, Route 9 is Hampshire County's major east-west highway artery, a vital link for commuters and businesses, which should not be allowed to deteriorate into gridlock. Second, Massachusetts cannot afford to construct a major bypass or expansion of Route 9, and no viable alternative route exists. Third, public safety is at stake, given the clear link between commercial strip development and higher accident rates.

If Route 9 is to remain at all passable into the next century, a comprehensive program of land use control strategies will be necessary to regulate development and resulting traffic volumes and impacts. To be effective such a program should be multi-faceted in addressing the elements of traffic volume control, access control and commercial development appearance or aesthetic impacts. It should be adopted jointly by the Towns of Hadley and Amherst, the City of Northampton, the Massachusetts Department of Public Works, the University of Massachusetts, and the Five College system. Each of these entities plays an important role in Route 9 traffic problems, and will benefit from improvements in the traffic situation.

The following recommended land use strategies are designed to dovetail with transportation improvements recommended in PVPC's Technical Memorandum on Transportation Improvements.

9.1 Summary of Recommendations

The following is a brief summary of the intergovernmental, municipal, university/colleges, and state agency recommendations which are described in detail in Sections 9.2 - 9.5:

# 1 Adopt an Intergovernmental Memorandum of Agreement
# 2 Adopt Commercial Corridor Site Plan Approval Standards with Required Traffic Impact Statements
# 3 Adopt Trip Reduction Ordinances
# 4 Divide Corridor Into Multiple Zoning Districts
# 5 Planned Unit Development: Linking Housing to Commercial Development
# 6 Control Residential Conversions
# 7 Improve Zoning Controls for Signs, Parking, Landscaping and Design
# 8 Development Phasing
# 9 Adopt Comprehensive Access Control Policy
#10 Land Acquisition Under MDPW Open Space Program
#11 Traffic Impact Fees
#12 Billboard Amortization and Removal
#13 Parking and Transit Policy to Reduce Single-occupancy Vehicle Trips
#14 Flexible Hours Policy for University and College Employees
#15 Mitigate Traffic Impacts of Proposed New University Facilities

9.2 Intergovernmental Recommendations

Route 9 Action #1 - Adopt an Intergovernmental Memorandum of Agreement

The Communities of Amherst, Hadley and Northampton, the Massachusetts Department of Public Works, the University of Massachusetts, and Five Colleges, Incorporated should adopt an intergovernmental compact establishing a comprehensive program for Route 9 traffic control. The compact should:

- Establish a permanent Route 9 Corridor of Critical Concern Advisory Committee (Route 9 CAC)
- Promote coordinated zoning controls to mitigate traffic impacts in the Amherst, Hadley and Northampton sections of the Route 9 corridor. (see Recommendations #2-8)
- Establish intergovernmental review procedures for developments which would have significant impacts on Route 9.
- Establish a comprehensive curb cut control program (see Recommendation #9)
- Promote the establishment of traffic reduction programs at the University of Massachusetts and other area colleges. (see Recommendations #14-15)

A draft Memorandum of Agreement is contained in Appendix A.

9.3 Municipal Recommendations

Route 9 Action #2 - Adopt Commercial Corridor Site Plan Approval Standards With Required Traffic Impact Statements

Hadley, Amherst and Northampton should adopt consistent Commercial Corridor Site Plan Approval zoning bylaws. These standards should be applied to all new business and industrial uses, proposed expansions or changes in use. The bylaws should require that business projects minimize traffic and safety impacts on Route 9. A traffic impact statement should be required for all projects. New businesses should be clustered or required to share access where feasible. Performance standards should be established for:

- access and traffic impacts;
- parking and loading;
- landscaping and lighting;
- appearance/architectural design;
- environmental impacts;

A model bylaw is included in Appendix B, based on a bylaw adopted by Hadley in 1989.

Route 9 Action #3 - Adopt Trip Reduction Ordinances

Hadley, Amherst and Northampton should adopt trip reduction ordinances which require the preparation of a "Trip Reduction Plan" for any new business use. These plans should identify traffic impact mitigation strategies designed to reduce the traffic anticipated to be generated by the new business by a minimum of 35%. Trip reduction strategies could include:

- carpooling/vanpooling incentive programs
- construction of transit shelters
- increased transit accessibility; improved service
- bicycle and pedestrian incentive measures
- variable work hour or flex time programs
- creating a transportation systems management coordinator position

Route 9 Action #4 - Divide Corridor Into Multiple Zoning Districts

The Route 9 corridor in Hadley is currently zoned as a continuous commercial strip from the Northampton-Hadley town line to the Amherst-Hadley town line. All types of commercial uses are allowed anywhere in the district. In contrast, most of the adjoining Route 9 segments in Amherst and Northampton are zoned for residential use.

Hadley should consider dividing the commercial zone into segments where varying degrees of commercial intensity are permitted. This zoning pattern would direct more intensive traffic generating uses to areas best able to accommodate these uses, such as clustering uses near major intersections and areas with adequate road width. It would also enable Hadley to maintain the historic character and integrity of its town center. The following districts are suggested and illustrated on Map 4:

- High Intensity Business District: high traffic generating uses, planned unit developments
- Low Intensity Business/Residential Districts: low traffic generating businesses, residential development
- Historic/Commercial District: limited business with more stringent design review standards
- Light Industrial Research Park District: light industrial, research, office space

Route 9 Action #5 - Planned Unit Development: Linking Housing to Commercial Development

Across the United States and the Pioneer Valley, a major contributor to growing rush-hour congestion on highways is the mis-match between the locations of jobs and housing. Creating a better balance of housing and jobs will ease future traffic congestion. Planned unit development bylaws can be useful in achieving better designed development and achieving municipal goals.

Large-scale commercial developments should be permitted in the Route 9 corridor only by Special Permit through a Planned Unit Development (PUD) process. A Planned Unit Development ordinance should be developed and adopted, establishing regulations for:

- floor area ratios to regulate development intensity
- provision of open space through clustering of buildings
- provision of on-site housing for workers in proposed project

- provision of on/off-site traffic improvements and mitigation measures
- performance standards for architectural design, landscaping and environmental protection

Appendix F contains a PUD ordinance adopted by the Town of Reading, Massachusetts, which provides a useful model for the Route 9 corridor.

Route 9 Action #6 - Control Residential Conversions

In the Amherst, Hadley and Northampton sections of the Route 9 corridor there exist blocks of residential development on relatively small lots. In Amherst and Northampton, these residential areas are zoned for residential use, in Hadley they are zoned commercial. Much of this land is ripe for conversion to commercial use, creating multiple problems of frequent curb cuts and traffic impacts. In Hadley, such conversions have already begun to occur.

Hadley should control residential conversion by adopting minimum dimensional standards (i.e. frontage, lot size) for conversion of existing residences to commercial use. Zoning should specifically restrict construction to only one principal use per lot. The comprehensive access control policy in Recommendation #9 will also help to control this problem. Amherst and Northampton should adopt a policy of no re-zoning for existing residential zones in the Route 9 corridor.

Route 9 Action #7 - Improving Zoning Controls for Signs, Parking, Landscaping and Design

Hadley should adopt upgrade zoning to regulate the impact of commercial development on aesthetics, design, historic character and traffic safety in the Route 9 corridor. Zoning controls should be strengthened in the following areas:

- Sign regulations for sign size, height, illumination and placement
- Parking standards
- Design review procedures for architecture, materials, landscaping

Route 9 Action #8 - Development Phasing

As a temporary emergency measure, the Route 9 corridor communities may need to consider the adoption of phased growth bylaws for commercial development. If commercial growth rates continue to outstrip the traffic-bearing capacity of Route 9 and the ability of the state to make improvements, a growth phasing system may be justified. A growth phasing system would place an annual limit on the number of commercial building permits issued.

9.4 State Agency Recommendations

Route 9 Action #9 - Develop Comprehensive Access Control Standards for Route 9

As part of the Critical Corridor Designation for Route 9, the Massachusetts Department of Public Works and the Route 9 CAC should develop a comprehensive access control standards for Route 9. The access control standards should be used to manage and evaluate curb cuts. Components of the program should cover each of the following use types:

- New businesses or business complexes
- Change of use of businesses
- Existing businesses
- Residential conversions to business

The access control standards should address the following issues:

- Correction of existing access problems, including consolidation of existing curb cuts
- Require a minimum distance between curb cuts
- Require a minimum distance between curb cuts and intersections
- Require new uses to integrate access, circulation and parking with adjoining properties
- Limit curb cuts to one per business, except in special circumstances
- Require access on side roads or frontage roads, if feasible
- Require circulation within large commercial developments to be designed to ensure that internal circulation will minimize the need for frequent use of Route 9
- Promote use of frontage or loop roads, and common driveways
- Provide for the installation of vertical curbs to go along the entire length of Route 9 to prevent uncontrolled access

Probably the key element of these comprehensive access control standards is the requirement for shared access among adjoining properties. This requirement would be difficult to achieve through municipal zoning controls, but could be enforced through the curb cut process. (See Appendix G).

Note: It is anticipated that this recommendation will be addressed by Mass. Department of Public Works (MDPW) and the Route 9 Corridor of Critical Concern Advisory Committee (CAC) via the following means:

a) The Route 9 CAC should develop standards and procedures for reviewing highway access for "developments of regional impact" (DRIs) in the Route 9 corridor;

b) A new, revised MDPW Access Policy Statement with a companion document on MDPW standards operating procedures.

Route 9 Action #10 - Land Acquisition Under MDPW Open Space Program

The only way to ensure that land will remain as open space, and will, therefore, preserve views and scenic qualities, and not degrade existing traffic conditions, is for MDPW to purchase it for that purpose. PVPC has applied to the MDPW Open Space Committee to purchase a large parcel of farmland on Route 9. The parcels proposed for acquisition constitute the last remaining block of open space on Route 9. They provide scenic vistas of farmland, the Holyoke Range and Mt. Warner. DEM has also expressed interest in jointly acquiring the parcel with MDPW. Review of the grant application has been tabled by the MDPW Open Space Committee pending appraisal of the property, an expense which PVPC was unable to incur. If, in the future, an agreement can be worked out for a multi-agency purchase, PVPC or the Town of Hadley should go ahead with the appraisal of appropriate parcels.

Route 9 Action #11: **Traffic Mitigation Fund**

MDPW has established a Public/Private Development Unit (PPDU) for the purposes of:

- overseeing the issuance of access permits under the provisions of M.G.L. Chapter 81, Section 21;
- requiring applicants to use all practiciable means and measures to minimize damage to the environment under the provisions of M.G.L. Chapter 30, Section 61;
- establishing means to facilitate safe and efficient traffic flow for developments which generate a substantial increase in or impact on traffic.

The 1988 Massachusetts Transportation Bond, Section 60, amended the "access statute", (M.G.L. Chapter 81, Section 21) to provide that businesses which "generate a substantial increase in or impact on traffic" may be required to install and pay for physical improvements made necessary to ensure safe traffic flow (see Appendix E).

Given this statutory authority, MDPW and the Route 9 Corridor of Critical Concern Citizen's Advisory Committee should develop and implement an equitable traffic mitigation fund to pay for the cost of Route 9 improvements made necessary by increased traffic generation from new or expanded residential, commercial or other facilities in the Route 9 corridor. Project proponents should be required to make necessary physical improvements to the Route 9 corridor in the vicinity of their projects, and to contribute to the Route 9 "Traffic Mitigation Fund" on a "fair share" formula, based upon the volume of traffic each business generates. Traffic mitigation revenues should be expended only for planning and construction of capacity and safety improvements for Route 9. Similar traffic mitigation funds have been established by MDPW and communities elsewhere in Massachusetts, including Brewster (Routes 6A, 137, 124 and 6) and Peabody.

The traffic mitigation fund should be formalized through an amendment to the "Memorandum of Agreement for the Mitigation of Traffic Impacts along the Route 9 Corridor". Management of the traffic mitigation fund could be handled either by the Route 9 CAC, or by one of its member municipalies.

Route 9 Action #12 - **Billboard Amortization and Removal**

The Massachusetts Outdoor Advertising Board has authority to delicense billboards. The Route 9 corridor has multiple existing billboards, which aesthetically degrade the corridor and may distract motorists, creating a minor safety hazard. An equitable approach to billboard removal, used in many localities and states, is amortization of billboard value, and removal at the end of the amortization period. This approach should be evaluated for the Route 9 corridor.

9.5 University and Five College, Inc. Recommendations

Route 9 Action #13 - Parking and Transit Policy to Reduce Single-Occupancy Commuter Trips

The University of Massachusetts and Five Colleges, Inc. should adopt a parking policy to discourage single-occupancy commuter trips on Route 9 and encourage use of available transit, and car-pooling alternatives. Options which should be considered to achieve this goal include:

- establishing a full-time transportation systems management coordinator position
- preferential parking locations for car-pool and van-pool vehicles
- education and promotion of transit use for students and staff
- encouraging bicycle commuting by providing bike paths and bike storage facilities
- provision of ride matching services
- constructing transit shelters
- restricting parking permit availability to sophomores, juniors and seniors

Route 9 Action #14 - Flexible Hours Policy for University and College Employees

The University of Massachusetts and Five Colleges, Inc. should adopt a flexible hours policy for all staff and personnel which can work alternate hours without affecting services. Employees should be encouraged to commute during the non-peak hours avoiding rush hours when Route 9 experiences its worst traffic jams.

Route 9 Action #15 - Mitigate Traffic Impacts of Proposed New University Facilities

The University of Massachusetts should undertake detailed traffic studies to determine steps that can be taken to reduce traffic impacts on Route 9. A "trip reduction plan" such as that recommended in Recommendation #3 should be prepared for each new project. In particular, the University should carefully examine the scheduling of events for the proposed new Mullin Convocation Center/Arena to avoid creating major impacts on Route 9 rush hour traffic.

Other colleges in the Five-College system should follow similar procedures.

10.0 STATUS OF RECOMMENDATIONS AND IMPLEMENTATION

In the period since Pioneer Valley Planning Commission first developed its "Route 9 Corridor Study Technical Memorandum on Land Use" in 1988, PVPC and the Town of Hadley have been working to implement some of that report's preliminary recommendations. In 1989, the Hadley Growth Management Committee and PVPC recommended the adoption of two Route 9 traffic control measures at the Annual Town Meeting. The Town Meeting voted to adopt a new Commercial Corridor Site Plan Approval bylaw, which included a trip reduction ordinance. Town Meeting rejected bylaws which would have prohibited certain high traffic-generating uses, such as gas stations and convenience stores in the Route 9 and Route 47 corridors.

The Hadley Growth Management Committee and PVPC completed work, in late 1989, on a package of additional zoning changes for sign and parking control, and for a new light industrial research park zone. These changes are expected to be considered by Town Meeting at a later date.

Northampton and Amherst's Planning Boards have also been working, in concert with PVPC, to adopt commercial corridor zoning regulations.

The Intergovernmental MOA has been adopted by all signatures, and formally went into effect on October 2, 1990. The Route 9 Corridor of Critical Concern Advisory Committee has been appointed, and has been meeting monthly to undertake regional development reviews and other business.

Table 17 summarizes the status of this report's recommendations as of July 1991.

Table 17. **STATUS OF RECOMMENDATIONS AND IMPLEMENTATION**

	MUNICIPALITY OR INSTITUTION					
RECOMMENDATIONS	HADLEY	AMHERST	NORTHAMPTON	MASS. DPW	UMASS/ 5 COLLEGES	OTHER
# 1 - Intergovernmental MOA	✓	✓	✓	✓	✓	
# 2 - Commercial Site Plan Approval	✓	✻	✓			
# 3 - Trip Reduction Ordinance	✓	✻	✓			
# 4 - Multiple Zoning Districts	✻					
# 5 - Planned Unit Development	○	○	○			
# 6 - Control Residential	○	○	○			
# 7 - Update Sign, Parking, Design Zoning	✻					
# 8 - Development Phasing	○	○	○			
# 9 - Comprehensive Access Control Policy				✻		
#10 - Land Acquisition				○		
#11 - Traffic Mitigation Fund				✓		
#12 - Billboard Removal						○
#13 - Parking and Transit Policy					○	
#14 - Flexible Hours Policy					○	
#15 - Mitigate New Facility Impacts					○	

Legend:

✓ Recommendation adopted ○ Work needed to adopt recommendation ✻ Work in progress

10.0 STATUS OF RECOMMENDATIONS AND IMPLEMENTATION

In the period since Pioneer Valley Planning Commission first developed its "Route 9 Corridor Study Technical Memorandum on Land Use" in 1988, PVPC and the Town of Hadley have been working to implement some of that report's preliminary recommendations. In 1989, the Hadley Growth Management Committee and PVPC recommended the adoption of two Route 9 traffic control measures at the Annual Town Meeting. The Town Meeting voted to adopt a new Commercial Corridor Site Plan Approval bylaw, which included a trip reduction ordinance. Town Meeting rejected bylaws which would have prohibited certain high traffic-generating uses, such as gas stations and convenience stores in the Route 9 and Route 47 corridors.

The Hadley Growth Management Committee and PVPC completed work, in late 1989, on a package of additional zoning changes for sign and parking control, and for a new light industrial research park zone. These changes are expected to be considered by Town Meeting in 1990.

Table 17 summarizes the status of this reports recommendations as of January, 1990.

Table 17. STATUS OF RECOMMENDATIONS AND IMPLEMENTATION AS OF 1/90

RECOMMENDATIONS	MUNICIPALITY OR INSTITUTION HADLEY	AMHERST	NORTHAMPTON	MASS. DPW	UMASS/ COLLEGES	OTHER
# 1 - Intergovernmental MOA						
# 2 - Commercial Site Plan Approval	✓	○	○			
# 3 - Trip Reduction Ordinance	✓	○	○			
# 4 - Multiple Zoning Districts	○ ✻					
# 5 - Planned Unit Development	○	○	○			
# 6 - Control Residential	○	○	○			
# 7 - Update Sign, Parking, Design Zoning	✻					
# 8 - Development Phasing	○	○	○			
# 9 - Comprehensive Access Control Policy				○ ✻		
#10 - Land Acquisition				○		
#11 - Traffic Impact Fees				○		
#12 - Billboard Removal						○
#13 - Parking and Transit Policy					○	
#14 - Flexible Hours Policy					○	
#15 - Mitigate New Facility Impacts					○	

Legend:

✓ Recommendation adopted

○ Work needed to adopt recommendation

✻ Work in progess

APPENDIX A

DRAFT
INTERGOVERNMENTAL MEMORANDUM OF AGREEMENT

DRAFT

MEMORANDUM OF AGREEMENT

FOR THE MITIGATION OF TRAFFIC IMPACTS ALONG THE ROUTE 9 CORRIDOR

by and among;

the Towns of Amherst and Hadley, the City of Northampton, the Massachusetts Department of Public Works, the Pioneer Valley Planning Commission, the University of Massachusetts, and Five Colleges, Incorporated.

WITNESSETH:

WHEREAS, the Route 9 Corridor is the major east-west travel artery in Hampshire County and is thus a crucial transportation route for commuters to employment, for business transport of goods and services, and for residents to reach shopping, schools and other destinations;

WHEREAS, Route 9 has been designated as a "Corridor of Critical Concern" by the Massachusetts Department of Public Works due to existing traffic volume and safety problems which have reached unacceptable levels in some sections of Route 9 and which are projected to become increasingly serious problems in the future;

WHEREAS, the Route 9 Corridor bisects the municipalities of Amherst, Hadley and Northampton, and land use changes regulated by the zoning bylaws of these communities may have a significant impact on Route 9 Corridor traffic, and on municipal character, environment and overall quality of life;

WHEREAS, the Massachusetts Department of Public Works has authority to regulate access to Route 9, and to require or institute transportation improvements to Route 9;

WHEREAS, the University of Massachusetts and Five Colleges, Inc. are heavily dependent upon Route 9 for access to these higher institutions, and are also significant individual generators of traffic on Route 9;

WHEREAS, continued and significant reductions in the level of service on Route 9 would undoubtedly adversely affect the communities, businesses, institutions and residents in the Route 9 Corridor and the entire region;

WHEREAS, reductions in motor vehicle trips are beneficial in that they reduce traffic congestion and accident levels, vehicular emissions, energy consumption and noise levels;

WHEREAS, innovative and less intrusive regulatory alternatives in the area of traffic and transportation impact management have been shown to be effective and capable of reducing existing traffic or limiting increases in traffic;

WHEREAS, a concerted, regional, intergovernmental approach to traffic management, which creates an environment conducive to successful operation of businesses, industries and institutions,m and which equitably allocates responsibility for traffic level reductions to both existing employers and proposed development is desirable;

Now, THEREFORE, IT IS RESOLVED that the Towns of Amherst and Hadley, the City of Northampton, the Massachusetts Department of Public Works, the Pioneer Valley Planning Commission, the University of Massachusetts, and Five Colleges, Inc., hereby agree cooperate and pursue all reasonable measures to mitigate traffic impacts along the Route 9 Corridor as follows:

Section 1. Creation of a Corridor of Critical Concern Advisory Committee

The participants shall form a permanent organization to be known as the Route 9 Corridor or Critical Concern Advisory Committee, hereafter referred to as the "COCCAC"; consisting of one member of each town's Board of Selectmen, a designee from the Mayor's Office from the City of Northampton, one member from each community's Planning Board, and one representative each from the Massachusetts Department of Public Works, the Pioneer Valley Planning Commission, and the University of Massachusetts or Five Colleges, Inc. Each municipality, organization or educational institution shall have one vote; if the two members from a town or city disagree, the vote of the chief elected official shall be the official vote. The Association may invite any other person or organization concerned with Route 9 traffic issues to become an associate member and to participate in committee deliberations, but not to vote.

Section 2. The Purpose and Functions of the Route 9 Corridor of Critical Concern Advisory Committee

The purpose of the COCCAC shall be to consult, cooperate and act jointly in matters pertaining to traffic impacts along the Route 9 Corridor.

The Association shall have the following functions:

a. To promote and develop coordinated plans, strategies and municipal bylaws tomitigate traffic impacts from land use and development in the Amherst, Hadley and Northampton sections of the Route 9 Corridor;

b. To establish intergovernmental review procedures for developments which would have significant impacts on Route 9, and to review and comment on such developments;

c. To establish a comprehensive curb cut control program to coordinate intergovernmental policies and regulations regarding access to Route 9;

d. To promote the establishment of traffic reduction programs at the University of Massachusetts, and other area colleges, businesses and institutions which have significant traffic impacts on Route 9.

Section 3. Intergovernmental Review Procedures for the Route 9 Corridor

COCCAC shall implement an advisory process for intergovernmental review of proposed developments or land use changes within the designated Route 9 Corridor as illustrated on the map "Route 9 Corridor" prepared by the Pioneer Valley Planning Commission, which may adversely affect traffic on Route 9.

To assure that the COCCAC can carry out its functions, the following actions shall be taken:

1. PVPC shall send to each member municipality copies of all NEPA, MEPA, regional clearinghouse, industrial revenue bond, or other intergovernmental review notices received or initiated by PVPC regarding projects in the Route 9 Corridor as mapped by PVPC and approved by COCCAC.

2. The COCCAC shall, as soon as feasible after its formation, notify the Board of Selectmen, Planning Board, Board of Health, Conservation Commission, and Zoning Board of Appeals within each participating municipality of the existence and objectives of COCCAC and shall thereafter send copies of

all plans, programs, publications or recommendations of COCCAC to each such board.

3. The planning board of each municipality shall send to designated COCCAC members from each municipality and PVPC notice of all proposed and adopted zoning amendments, and, at the earliest possible time during review proceedings, information regarding any proposed site plan approval, special permit, subdivision requiring approval under subdivision control law, or removal of property from M.G.L. Chapters 61, 61A, or 61B, where such is to occur within the Route 9 Corridor. Said notice shall be accompanied by notice of comment periods and meetings or hearings to be held regarding the proposal.

4. Upon receipt of any item stated in Sections 3-1 and 3-3 above, the COCCAC and/or its member municipalities may request additional information or notice of action, and may recommend measures to minimize or mitigate foreseeable significant impacts of any such proposal.

Section 4. Powers of the COCCAC

To carry out its functions, the COCCAC shall have the following powers:

1. To receive money and support from any source by donation or appropriation, provided that such money is for the purpose of carrying out the business or goals of the COCCAC.

2. To establish a bank account, enter into contracts, and to expend money, provided that all such contracts and expenditures are for the sole purpose of carrying out the regular business and functions of the COCCAC.

   The COCCAC may make expenditures for the purposes of carrying out their meeting, such as for meeting facilities, audio-visual equipment, supplies and refreshments.

3. To issue statements and materials in the name of the COCCAC.

4. To develop proposals for, seek, receive and implement assistance and grants from state, federal and private sources, provided that the proposal for each shall be approved by two-thirds of the members of the COCCAC.

The COCCAC shall not be empowered to make binding decisions or commitments other than the contracts or expenditures listed above.

The COCCAC shall not act on behalf of or impose any requirements upon any member municipality or PVPC. COCCAC shall not be empowered to enter into any contract or agreement for the regular employment of any person or for the purchase or lease of any interested in real property or in personal property over the value of $250.00, expect as explicitly authorized by the unanimous vote of COCCAC.

Section 5. Role of the Communities

The Towns of Amherst and Hadley, and the City of Northampton shall have the following responsibilities:

a. To participate in intergovernmental review procedures established for developments which would have significant traffic impacts on Route 9;

b. To adopt commercial corridor site plan approval standards, with required traffic impact statements and traffic mitigation measures;

c. To adopt trip reduction ordinances which require new developments to identify traffic impact mitigation strategies designed to reduce traffic generation;

d. To update and improve municipal zoning ordinances for the Route 9 Corridor to promote planned growth which will minimize traffic impacts, encourage planned unit development, clustering and shared access, restrict high-volume traffic generating uses to appropriate locations, promote new development in keeping with municipal character, and establish standards for signs, parking, landscaping and architectural design; and

e. To control conversion of existing residences to commercial use.

These issues are described in greater detail in the Route 9 Corridor Study" prepared by Pioneer Valley Planning Commission.

Section 6. Role of Massachusetts Department of Public Works

The Massachusetts Department of Public Works (MDPW) shall have the following responsibilities"

a. To participate in intergovernmental review procedures established for developments which would have significant traffic impacts on Route 9;

b. As part of the Critical Corridor Designation for Route 9, the MDPW should adopt a Comprehensive Access Control Policy, as described in the "Route 9 Corridor Study";

c. Where feasible, to work with other state agencies and municipalities, to acquire open land on Route 9 under the MDPW Open Space Program;

d. To implement an equitable program to ensure the installation necessary to ensure state traffic flow in the Route 9 Corridor.

Section 7. Role of the Pioneer Valley Planning Commission (PVPC)

The PVPC shall have the following responsibilities:

a. To participate in intergovernmental review procedures established for developments which would have significant traffic impacts on Route 9;

b. To provide technical assistance to the communities in meeting their obligations under this agreement.

Section 8. Role of the University of Massachusetts (UMass) and Five Colleges, Inc.

The UMass and Five Colleges, Inc. shall have the following responsibilities:

a. To adopt parking and transit policies which discourage single occupancy commuter trips on Route 9, and encourage use of available transit and car-pooling alternatives;

b. To adopt and encourage the use of a flexible hours policy for UMass and Five College employees, wherever feasible, in order to reduce peak hour traffic;

c. To undertake detailed traffic studies and implement traffic mitigation measures to reduce impacts of proposed new facilities.

Section 9. Withdrawal From Membership

Any member municipality may withdraw from participation in the COCCAC upon two months written notice signed by the Board of Selectmen, or City Council or governing body of an institution, such notice to be given only after approval of such withdrawals is given by majority vote of town meeting or City Council of the withdrawing municipality, or governing body of the withdrawing institution.

Section 10. Rules of Procedure and Operation

The COCCAC shall, at its first meeting, adopt rules governing its decision-making process, frequency and location of meetings, address for purpose of correspondence, and general operations. Adoption of these rules shall require and affirmative four-fifths vote.

PVPC may provide staff assistance to the COCCAC (such as coordinating meetings, maintaining a file of records and correspondence, etc.), act as executive secretary to COCCAC, and furnish professional assistance to COCCAC or its member municipalities.

Section 11. Committee Evaluation

Six months after the execution of this agreement the signatories or other then-participating members of the COCCAC shall review and evaluate the performance of the COCCAC and make recommendations concerning its future operations. After such initial evaluation, the COCCAC shall conduct similar evaluations once each twelve months.

Section 12. Amendments

This Memorandum of Agreement may be amended or rescinded at any time by mutual agreement of all member municipalities.

Section 13. Authorization/Effective Date

This agreement has been authorized by vote of the Pioneer Valley Planning Commission, and by votes of the governing body of each participating institution, and by votes of the Town Meeting, City Council or Board of Alderman in each municipality, in accordance with Massachusetts General Laws Chapter 40, Section 4. This Memorandum will become effective when it is signed by all participating parties.

____

Chairman, Hadley Board of Selectmen

____

Mayor, City of Northampton

____

Chairman, Amherst Board of Selectmen

____

Commissioner, Massachusetts Department of Public Works

____

Executive Director, Pioneer Valley Planning Commission

____

Chancellor, University of Massachusetts

____

Five Colleges, Incorporated

APPENDIX B

MODEL COMMERCIAL CORRIDOR SITE PLAN APPROVAL BYLAW AND TRIP REDUCTION BYLAW

VIII. COMMERCIAL SITE PLAN APPROVAL

A. Purposes

1. To promote the safety of vehicular and pedestrian movement with the site and in relation to the adjacent areas, highway traffic safety and protect the capability of state and local roads to conduct traffic smoothly

2. To promote an attractive and viable commercial district and expand the commercial tax base of the Town;

3. To protect the rural character, aesthetic visual qualities, natural environmental features, historical features and property values of the Town and neighboring properties;

4. To discourage unlimited commercial "strip development" and curb cuts along highways, and encourage commercial growth in nodes and clusters.

B. Projects Requiring Site Plan Approval

Within the Business, Limited Business or Industrial Districts, no special permit or building permit shall be issued and no application for such permits shall be accepted for any of the following uses:

1. the construction or exterior alteration of a business structure;

2. the construction or exterior alteration of an industrial structure;

3. any expansion or change in use of a business or industrial structure;

unless a site plan has been endorsed by the Planning Board, after consultation with other boards, including but not limited to the following: Building Inspector, Board of Health, Board of Selectmen, Historical Commission, Conservation Commission, Highway Department, Fire Department and Police Department. The Planning Board may waive any or all requirements of site plan review for external enlargements of less than 10% of the existing floor area.

C. Exemption From Site Plan Approval

Site plan approval shall not be required for:

1. the construction or enlargement of any single family or two family dwelling or building accessory to such dwelling.;

2. or any building used exclusively for agriculture, horticulture or floriculture.

D. Applications for Site Plan Approval

1. Each application for Site Plan Approval shall be submitted to the Planning Board by the current owner of record, accompanied by nine (9) copies of the site plan.

2. The Planning Board shall obtain with each submission, a deposit sufficient to cover any expenses connected with a public hearing and review of plans, including the costs of any engineering or planning consultant services necessary for review purposes.

E. REQUIRED SITE PLAN CONTENTS

1. All site plans shall be prepared by a registered architect, landscape architect, or professional engineer unless this requirement is waived by the Planning Board because of unusually simple circumstances. All site plans shall be on standard 24" x 36" sheets at a scale of 1 inch equals 20 feet, with additional narrative as necessary.

    a. Name of the project, locus, date and scale plan;

    b. Name and address of the owner of record, developer, and seal of the engineer, landscape architect or architect;

    c. The location and boundaries of the lot, adjacent streets or ways, and the location and owner's names of all adjacent properties and those within 300 feet of the property line, and all zoning district boundaries;

    d. Existing and proposed topography at the two foot contour interval the location of wetlands, streams, waterbodies, drainage swales, areas subject to flooding and base flood elevations and unique natural land features;

    e. Existing and proposed structures, including dimensions and elevations; and all exterior entrances and exits;

    f. The location of parking and loading areas, public and private ways, driveways, walkways, access and egress points;

    g. The location and description of all proposed septic systems,percolation test when necessary, water supply, storm drainage systems including existing and proposed drainlines, culverts, drainage swales, catchbasins, drainage calculations, and subdrainage along with soil logs, utilities, hydrants, manholes, lighting fixtures, and refuse and other waste disposal methods;

    h. Proposed landscape features including the location and a description of buffers, screening, fencing, and plantings, including the size and type of plant material;

    i. The location, dimensions, height, color, illumination and characteristics of existing and proposed signs;

    j. The location and a description of proposed open space or recreation areas;

    k. The plan shall describe estimated daily and peak-hour vehicle trips to be generated by the site and traffic flow patterns for vehicles and pedestrians showing adequate access to and from the site and adequate circulation within the site. A detailed traffic impact statement is required for use as specified in Section H-(1)-(f).

    l. A plan for the control of erosion, dust, and silt, both during and after construction sequencing, temporary and permanent erosion control, and protection of water bodies.

    m. For alterations to any existing or new business/commercial/industrial uses a table containing the following information:

        1. Maximum area of building to be used for selling, offices, business, industrial or other uses.
        2. Maximum number of employees where applicable.
        3. Maximum seating capacity where applicable.
        4. Number of parking spaces existing or required for the intended use.

n. Elevation plans at a scale of 1/4" = 1'0" for all exterior facades of the proposed structures(s) and/or existing facades plus addition(s) showing design features and indicating the type and color of materials to be used.

The Planning Board may waive any information requirements it judges to be unnecessary to the review of a particular plan.

F. PROCEDURES FOR SITE PLAN REVIEW

1. The Planning Board shall transmit one copy each to the Building Inspector, Board of Health, Conservation Commission, Highway Department, Historical Committee, Fire Department, and Police Department, who shall review the application and submit their recommendations and comments to the Planning Board concerning:

   a. the adequacy of the date and methodology used by the applicant to determine the impacts of the proposed development:
   b. the effects of the projected impacts of the proposed development; and
   c. recommended conditions or remedial measures to accommodate or mitigate the expected impacts of the proposed development.

   Failure of Boards to make recommendations within 35 days of the referral of the application shall be deemed to be lack of opposition.

2. The Planning Board shall hold a public hearing within sixty-five (65) days of the receipt of an application and after due consideration of the recommendations received, the Board shall take final action within 90 days from the time of hearing. The Planning Board's final action in writing shall consist of either:

   a. Approval of the site plan based on a determination that the proposed project will constitute a suitable development and is in compliance with the standards set forth in this bylaw;

   b. Disapproval of the site plan based on a determination that the proposed project does not meet the standards for review set forth in this bylaw; or

   c. Approval of the project subject to any conditions, modifications and restrictions which will ensure that the project meets the Standards for Review.

3. The period of review for a special permit requiring site plan approval shall be the same as any other special permit and shall conform to the requirements of Chapter 40A, Sec. 9, "Special Permits". Specifically, a joint public hearing to address the Special Permit application and Site Plan Approval application shall be held within sixty-five (65) days of the filing of a special permit application with the Planning Board or Board of Appeals. The Planning Board shall then have 90 days following the public hearing in which to act.

G. SITE PLAN REVIEW CRITERIA

1. In reviewing and evaluating the site plan, and in making a final determination regarding site plan approval, the Planning Board shall consider the following criteria:

   a. The site plan complies with the Commercial Development and Performance Standards contained in Section H;

   b. The site plan minimizes traffic and safety impacts of the proposed development on adjacent highways or roads, and maximizes the convenience and safety of vehicular and pedestrian movement within the site;

c. The proposed development, to the extent feasible: a) is integrated into the existing landscape and protects abutting properties; b) minimizes adverse environmental impacts on such features as wetlands, floodplains, and aquifer recharge areas; c) minimizes obstruction of scenic views from publicly accessible locations; d) preserves unique natural or historical features; e) minimizes tree, vegetation, and soil removal and grade changes, f) maximizes open space retention; and g), screens objectionable features from neighboring properties and roadways.

d. The architectural design, layout and landscaping of the proposed development is in harmony with the historic, rural character of the neighborhood and the Town of Hadley.

e. The proposed development is served with adequate water supply and waste disposal systems and will not place excessive demands on Town services and infrastructure.

f. The site plan shows adequate measures to prevent pollution of surface or groundwater, to minimize erosion and sedimentation, and to prevent changes in groundwater levels, increased run-off and potential for flooding.

H. COMMERCIAL DEVELOPMENT AND PERFORMANCE STANDARDS

In order to receive site plan approval, all projects or uses must demonstrate compliance with the commercial development standards herein.

1. Access Standards

Applicants must demonstrate that the project will minimize traffic and safety impacts on highways.

a. The number of curb cuts on state and local roads shall be minimized. To the extent feasible, access to businesses shall be provided via one of the following:

(1) Access via a common driveway serving adjacent lots or premises

(2) Access via an existing side street

(3) Access via cul-de-sac or loop road shared by adjacent lots or premises.

b. One driveway per business shall be permitted as a matter of right. Where deemed necessary by the Special Permit Granting Authority, two driveways may be permitted as part of the Site Plan Approval process which shall be clearly marketed "entrance" and "exit."

c. Curb cuts shall be limited to the minimum width for safe entering and exiting, and shall in no case exceed 24 feet in width.

d. All driveways shall be designed to afford motorists exiting to highways with safe sight distance.

e. The proposed development shall assure safe interior circulation within its site by separating pedestrian, bicycle and vehicular traffic.

2. Traffic Impact Statement

A traffic impact statement shall be prepared, which shall contain:

(1) Traffic flow patterns at the site including entrances and egresses, loading and unloading areas, and curb cuts on site and within one hundred feet of the site.

(2) A detailed assessment of the traffic safety impacts of the proposed project or use on the carrying capacity of any adjacent highway or road, including the projected number of motor vehicle trips to enter or depart from the site estimated for daily hour and peak hour traffic levels, road capacities, and impacts on intersections.

(3) A plan to minimize traffic and safety impacts through such means as physical design and layout concepts, staggered employee work schedules, promoting use of public transit or carpooling, or other appropriate means;

(4) An interior traffic and pedestrian circulation plan designed to minimize conflicts and safety problems.

(5) Adequate pedestrian and bicycle access shall be provided as follows:

  (a) Sidewalk shall be provided to provide access to adjacent properties and between individual businesses within a development;

3. Trip Reduction Plan

a. In each case where a new building(s) or new use of more than 10,000 square feet shall prepare and submit a "Trip Reduction Plan" which clearly identifies a combination of transportation systems management strategies which are designed to reduce anticipated vehicle trips by 35%. These strategies should include, but are not limited to:

(1) Vanpool/Carpool incentive programs, such as employer subsidies for vanpools/carpools, preferred vanpool/carpool parking, ride matching services, and providing parking at the vanpool/carpool pick-up site.

(2) Allowing and encouraging flexible work hours and flexible work weeks.

(3) Encouraging pedestrian and bicycle commute modes by providing on-site bicycle parking storage, locker room facilities, bike and walking paths, and similar features.

(4) Site designs which are conducive to transit or vanpool use, such as convenient, weather protected transit shelters.

(5) Encouraging employee and customer use of transit services, including providing transit subsidies for improved transit service and accessibility.

(6) Provision of on-site services, retail opportunities, and housing if allowed in the zone.

(7) Naming a full-time or part-time transportation systems management coordinator to oversee implementing all strategies identified in the "Trip Reduction Plan."

4. Parking Standards

Proposed projects or uses must comply with Parking and Off-street Loading requirements in Section V-D and the following standards:

a. Parking areas shall be located to the side or rear of the structure. No parking shall be permitted within the required front yard of a structure.

b. To the extent feasible, parking areas shall be shared with adjacent businesses.

c. For developments which make a long-term commitment to actively promote employee and public use of transit, ridesharing, and other means to reduce single occupant vehicle (SOV) trips, minimum parking standards may be reduced by a percentage to be determined by the Planning Board based upon the adequacy of trip reduction plans submitted in accordance with Section H-1.

5. Landscaping

a. A landscaped buffer strip at least fifteen (15) feet wide, continuous except for approved driveways, shall be established adjacent to any public road to visually separate parking and other uses from the road. The buffer strip shall be planted with grass, medium height shrubs, and shade trees (minimum 2-inch caliper, planted at least every 50 feet along the road frontage). At all street or driveway intersections, trees or shrubs shall be set back a sufficient distance from such intersections so that they do not present a traffic visibility hazard. The sidewalk required above shall be incorporated into the buffer strip.

b. Large parking areas shall be subdivided with landscaped islands so that no paved parking surface shall extend more than 80 feet in width. At least one tree (minimum 2" caliper) per 35 parking spaces shall be provided.

c. Exposed storage areas, machinery, service areas, truck loading areas, utility buildings and structures and other unsightly uses shall be screened from view from neighboring properties and streets using dense, hardy evergreen plantings, or earthen beams, or wall or tight fence complemented by evergreen plantings.

d. All landscaped areas shall be properly maintained. Shrubs or trees which die shall be replaced within one growing season.

6. Appearance/Architectural Design

a. Architectural design shall be compatible with the rural/ historic character and scale of buildings in the neighborhood and the Town through the use of appropriate building materials, screening, breaks in roof and wall lines and other architectural techniques. Variation in detail, form and siting shall be used to provide visual interest and avoid monotony. Proposed buildings shall relate harmoniously to each other with adequate light, air, circulations, and separation between buildings. The Planning Board may take into consideration whether exterior building facades and materials are consistent with Hadley's character. For example, exterior materials such as wood or metal or vinyl clapboards or stone or brick, and treatment compatible on all four sides, are considered consistent with Hadley's character. All rooflines shall be peaked. Large work area doors or open bays shall not open toward or face roadways.

b. The Planning Board may adopt such regulations as may be necessary to further specify design standards.

7. Storm Water Runoff

a. The rate of surface water run-off from a site shall not be increased after construction. If needed to meet this requirement and to maximize groundwater recharge, increased runoff from impervious surfaces shall be recharged on site by being diverted to vegetated surfaces for infiltration or through the use of detention ponds. Dry wells shall be used only where other methods are infeasible and shall require oil, grease, and sediment traps to facilitate removal of contaminants.

b. Neighboring properties shall not be adversely affected by flooding from excessive run-off.

8. Erosion Control

Erosion of soil and sedimentation of streams and waterbodies shall be minimized by using the following erosion control practices:

a. Exposed or disturbed areas due to stripping of vegetation, soil removal, and regrading shall be permanently stabilized within six months of occupancy of a structure.

b. During construction, temporary vegetation and/or mulching shall be used to protect exposed areas from erosion. Until a disturbed area is permanently stabilized, sediment in runoff water shall be trapped by using staked haybales or sedimentation traps.

c. Permanent erosion control and vegetative measures shall be in accordance with the erosion/sedimentation/vegetative practices recommended by the Soil Conservation Service.

d. All slopes exceeding 15% resulting from site grading shall be either covered with 4 inches of topsoil and planted with a vegetative cover sufficient to prevent erosion or be stabilized by a retaining wall.

e. Dust control shall be used during grading operations if the grading is to occur within 200 feet on an occupied residence or place of business. Dust control methods may consist of grading fine soils on calm days only or dampening the ground with water.

9. Water Quality

All outdoor storage facilities for fuel, hazardous materials or wastes, and potentially harmful raw materials shall be located within an impervious, diked containment area adequate to hold the total volume of liquid kept within the storage area.

10. Explosive Materials

a. No highly flammable or explosive liquids, solids, or gases shall be stored in bulk above ground, unless they are located in anchored tanks at least seventy-five (75) feet from any lot line, town way, or interior roadway plus all relevant federal and state regulations shall also be met. Underground storage tanks are prohibited.

b. Propane gas tanks in 100-lb. cylinders (or smaller) shall be exempt from these safety regulations.

11. Lighting

a. Any outdoor lighting fixture newly installed or replaced shall be shielded so that it does not produce a strong, direct light beyond the property boundaries;

b. No light standard shall be taller than fifteen (15) feet.

12. **Vibration**

    a. No vibration shall be transmitted outside the property where it originates.

I. ENFORCEMENT

1. The Planning Board may require the posting of a bond or other adequate security to assure compliance with the plan and conditions and may suspend any permit or license when work is not performed as required.

2. Any special permit issued under this section shall lapse within one (1) year if a substantial use thereof has not commenced sooner except for good cause. The time required to pursue and await determination of a judicial appeal pursuant to Chapter 40a of the General Laws shall be included within the one (1) year time limit.

3. The Planning Board may periodically amend or add rules and regulations relating to the procedures and administration of this section.

APPENDIX C

MODEL SIGN BYLAW

5.0 SIGN BYLAW

5.00 PURPOSE: The purpose of the sign regulations set forth in this section shall be the following:

a. to protect public and private investments in buildings and open spaces;

b. to encourage signs which, by their location and design, are harmonious to the buildings and sites which they occupy, and which eliminate excessive and confusing sign display;

c. to eliminate potential hazards to motorist and pedestrians; and

d. to promote the public health, safety, and general welfare.

5.01 APPLICABILITY

The provisions of this section shall apply to the construction, erection, alteration, use, location, and maintenance of all signs located out-of-doors, to those signs affixed on any part of a building for the express purpose of being visible from the exterior of the building.

5.02 DEFINITIONS

a. Sign: Any permanent or temporary structure, devise, letter, word, model, banner, pennant, insignia, trade flag, or representation use as, or which is in the nature of an advertisement, announcement, or direction, or is designed to attract the eye by means including intermittent or repeated motion of illumination.

b. Sign, Accessory: Any sign that advertises, or indicates the person occupying the premises on which the sign is erected or maintained, or the businesses transacted thereon, or advertises the property itself or any part thereof as for sale or rent, and which contains no other matter.

c. Sign, Area of:

1. The area of a sign shall be considered to include all lettering, wording, and accompanying designs and symbols, together with the background on which they are displayed, any frame around the sign and any "cutouts" or extensions, but shall not include any supporting structure or bracing.

2. The area of a sign consisting of individual letters or symbols attached to or painted on a surface, building, wall or window, shall be considered to that of the smallest quadrangle or a triangle which encompasses all of the letters and symbols.

3. The area of a sign consisting of a three-dimensional object shall be considered to be the area of the largest vertical cross-section of that object.

4. In computing the area of signs one side of back-to-back signs shall be included.

d. Sign, Awning: A sign painted on or attached to the cover of a movable metallic frame, of the hinged, roll, or folding type of awning.

e. Sign, Free-Standing: A self-supporting sign not attached to any building, wall, or fence, but in a fixed location. This does not include portable or trailer type signs.

f. Sign, Movable: A sign capable of being readily moved or relocated, including portable signs mounted on a chassis and wheels, or supported by legs.

g. Sign, Non-Accessory: Any sign not an accessory sign.

h. Sign, Projecting: A sign which is affixed to building, or other structure and which extends more than six (6) inches beyond the surface to which it is affixed.

i. Sign, Roof: A sign which is located above, or projected above, the lowest point of the eaves or the top of the parapet wall of any building, or which is painted on or fastened to a roof.

j. Sign, Temporary: Any sign, including its support structure, intended to be maintained for a continuous period of not more than thirty(30) days in any calendar year.

k. Sign, Wall: Any sign which is painted on, incorporated into, or affixed parallel to the wall of a building, and which extends not more than six (6) inches from the surface of that building.

5.03 GENERAL REGULATIONS

5.031 Permitted Signs

Only signs which refer to a permitted use or an approved conditional use as set forth in Section 3.00 of the Hadley bylaw area permitted, provided such signs conform to the provisions of this section.

5.032 Prohibited Signs

a. Billboards and non-accessory signs are prohibited.

b. Flashing signs, roof signs, signs containing moving parts, and signs containing reflective elements which sparkle in the sunlight are not permitted. Signs indicating the current time and/or temperature are permitted providing they meet all other provisions of this bylaw.

c. Any sign advertising or identifying a business or organization which is either defunct or no longer located on the premises is not permitted.

d. In no case shall may sign exceed forty (40) square feet, and all signs shall conform to size standards in Section 5.08.

e. No new sign shall be permitted in the Floodplain District.

5.04 GENERAL STANDARDS

5.041 Any exterior sign or advertising device hereafter erected or maintained, must, unless expressly provided, conform to the following restrictions in all districts:

a. Any traffic, informational or directional sign owned and installed by a governmental agency shall be permitted.

b. No private sign shall be placed on a public property.

c. Signs necessary to warn of a hazard or to post land shall be permitted as required to accomplish these purposes.

d. Lettering signs: Letters shall be carefully formed and properly spaced, to be neat and uncluttered. Generally, no more than 60% of the total sign area shall be occupied by lettering.

e. Sign materials: Sign materials should be durable and easy to maintain. Signs may be constructed of wood, metal, slate, or marble, gold leaf, glass, canvas, stained glass, or encased in a wooden frame.

5.05 PLACEMENT STANDARDS/SIGN HEIGHT

5.051 Signs shall not be mounted on roofs or extend above the roof line.

5.052 No sign together with any supporting framework shall extend to a height above the maximum building height allowed in the district. Freestanding or movable

5.053 No sign shall interfere with safe sight distances for travel on a public way or at any intersection of a public way with a public way or driveway.

5.054 If any sign is supported by or suspended from a pedestal or post, it cannot project more than 24 inches over or into any pedestrian or vehicular way customarily used by the public.

5.055 Signs must not dominate building facades or obscure any architectural details, (including but not limited to arches, sills, moldings, and cornices).

5.056 No sign may be placed in a side yard or a rear yard as required for the particular district in which it is located.

5.057 Signs shall be placed at least 10 feet from any pedestrian or vehicular way customarily used by the public and shall be placed so as not to obstruct the view of traffic.

5.06 ILLUMINATION STANDARDS

5.061 No sign shall incorporate, or be lighted by, flashing or blinking lights, or be designed to attract attention by a change in intensity or by repeated motion.

5.062 Any illumination provided provided for signs shall be white only.

5.063 The light source shall be shaded from view off the premises.

5.064 No signs shall be illuminated between the hours of 11 p.m. and 6 a.m. unless the premises on which it is located is open for business.

5.07 ADDITIONAL STANDARDS FOR SPECIFIC TYPES OF SIGNS

5.071 Awning Signs

a. Awning signs must be painted on or attached flat against the surface of the awning, but not extend beyond the valance or be attached to the underside.

b. A minimum of eight (8) feet above side-walk level must be allowed for pedestrian clearance.

5.072 Construction Signs

One temporary sign of an architect, engineer, or contractor erected during the period such person is performing work on the premises on which such sign is erected and shall be permitted, provided: it shall not exceed for (4) square feet in surface area; and, it shall be set back at least ten (10) feet from the street lot line.

5.073 For Sale, Rent or Lease Signs

Any temporary sign advertising property for sale or lease shall be permitted provided:

a. Only one sign shall be erected and it shall not exceed for (4) square feet.

b. Such signs shall advertise only the property on which the sign is located.

c. The sign shall be removed by the owner or agent within thirty (30) days of rent, sale, or lease.

5.074 Moveable Signs

Moveable signs are not permitted in any district, except the Limited Business District and the Business District. In these areas, moveable signs made only of wood, and standing on legs not over four (4) feet in total height may be allowed.

5.075 Multiple Signs

Multiple signs shall be defined as a group of signs clustered together in a single structure or compositional unit. Multiple signs are used to advertise several occupants of the same building or building complex or development.

a. The display board shall be of an integrated and uniform design.

b. The allowable sign area shall be computed at 10% of the building front face square footage (FFSF), as computed by the length of times the width of the building facade, to achieve the base square footage, or forty (40) square feet, whichever is smaller.

5.076 Political Signs

a. A maximum of two (2) temporary signs per lot are allowed.

b. Such signs may not exceed four (4) square feet in area

c. Such signs shall be displayed no earlier than twenty (20) days prior to a voting day, and shall be removed within ten (10) days after a voting day.

5.077 Special Event Signs

A special event sign is a temporary sign that is used in connection with a circumstance, situation, or event (i.e, church bazaar, grand opening, fair, circus, festival) that is expected to be completed within a reasonably short or definite period.

a. A maximum of one (1) temporary sign per lot is allowed.

b. Such signs may not exceed ten (10) square feet in area.

c. Such signs may be erected no sooner than fourteen (14) days before the event and must be removed not later than seven (7) days after the event.

5.078 Entrance/Exit Signs

Signs with the words Entrance/Exit, directional arrows or other directional information.

a. Sign shall be a maximum size of 4 square feet.

b. One such sign per driveway is permitted.

c. Signs must be placed so as not to interfere with site distances.

5.079 Gas Station/Self-Service Signs

a. One exterior sign affixed to the front wall of the building not to exceed sixteen (16) square feet is permitted. The owner may elect to divide the one exterior sign into separate signs affixed to and parallel to the front wall and indicating separate operations or departments of the business, however that total area of the separate signs shall not exceed the maximum area permitted for a single exterior sign.

b. One free-standing pole sign is also permitted. It shall have a maximum height of 10 feet, a minimum area of ten (10) square feet and a minimum ground clearance of 7 feet.

c. The standard type of gasoline pump bearing in usual size and form, the name or type of gasoline and the price shall not be deemed to be in violation of this Bylaw.

5.08 DISTRICTS AND SPECIAL REGULATIONS

5.081 Signs in Residence Districts

a. A maximum of two (2) signs per lot is permitted.

b. Such signs may not exceed eight (8) square feet in area.

c. One sign per lot indicating the names of the occupants thereof shall be permitted which sign shall not exceed two (2) square feet in area.

d. One sign per lot relating to an allowed accessory use shall be permitted provided said sign shall not exceed two (2) square feet in area.

e. One identification sign for each membership club, funeral establishment, community facility or public facility if permitted provided that the sign shall not exceed eight (8) square feet in surface area.

f. Signs designated historical places or points of interest, erected by governmental authority or by a duly chartered historical association or the like is permitted, not to exceed four (4) square feet in area.

g. Signs relating to trespassing and hunting shall not exceed two (2) square feet in area. One sign per 50 feet of frontage is allowed.

5.082 Signs in Agricultural-Residential Districts

a. A maximum of two (2) signs per lot is permitted.

b. Such signs may not exceed in ten (10) square feet in area.

c. Any sign allowed under Section 5.081 in an Residence District shall be permitted.

d. No sign shall be permitted on which the principal product or service advertised is not regularly produced or available on the premises.

5.083 Signs in Limited Business District

Within these districts the intent of the sign regulation is to ensure visual compatibility with the scale and character of the surrounding architecture. The signage shall be designed to be readable by pedestrians and slow moving cars.

a. There shall be no more than two (2) types of signs (i.e., free-standing or window; or awning and window) employed per building, regardless of the number of occupancies.

    1. Each ground floor occupant of a building may display two (2) signs.

    2. Each occupant in an upper level of a building may display one sign.

b. Such signs may not exceed sixteen (16) square feet in area.

c. Any signs allowed under Section 5.081 in a Residence District, Section 5.082 in an Agricultural district shall be permitted.

d. Free-standing pole signs shall have a maximum height of 10 feet, a maximum area of 10 square feet and a minimum ground clearance of 7 feet.

e. Other free-standing signs shall have a maximum height of 4 feet and shall have a maximum area of 16 square feet.

f. Window signs shall not exceed more than thirty percent (30%) of the window area in which they are displayed.

5.084 Signs in the Business Districts and Industrial Districts

a. Each business may not display more than two (2) signs.

b. Each development may not display more than two (2) signs, one of which may be free-standing. For the purposes of this Section, development shall refer to a site which includes a lot or lots considered as a unit for the development purposes where the lot or lots is occupied by more than one business whether in the same structure or not.

c. Such signs shall not exceed forty (40) square feet in area.

d. Any signs allowed under Section 5.08 in a Residence District, Section 5.082 in an Agricultural District, and Section 5.083 in a Limited Business Business District shall be permitted.

e. The allowable sign area for a free-standing sign or wall sign shall be computed at 10% of the building front face square footage (FFSF), as computed by the length times the width of the building facade, to achieve the base square footage of width along the wall on which the business has its main entrance. In no case shall the area for any sign be greater than 40 square feet.

f. Any detached sign shall be set back from all adjacent public rights-of-way a distance of at least ten (10) feet. Signs, in all cases, shall avoid conflicts with public utilities and services.

g. Signs on adjacent storefronts should be coordinated in height and proportion. The use of a continuous sign-bank extending over adjacent shops within the same building is encouraged, as a unifying element.

5.09 ADMINISTRATION AND ENFORCEMENT

5.091 Permits

a. No sign larger than two square feet shall be erected, altered, displayed, relocated, enlarged or created without first obtaining a permit from the Building Inspector or Sign Officer. At minimum, all applications shall include a scale drawing specifying dimensions, illumination materials, and location on land or buildings. In shopping centers or other circumstances where two or more businesses occupy a single commercial complex, the permitted signs must be consistent with the general character of the structures.

b. The Building Inspector or Sign Officer shall issue a permit from a sign when an application therefor has been made and the sign complies with all applicable regulations of the Town and the State Building Code, Article 14. Such application may be filed by the owner of the land or building, or any persons who has the authority to erect a sign on the premises.

c. The Building Inspector or Sign Officer shall act within 30 days of receipt of said application together with the fee. The Building Inspector's or Sign Officer's action or failure to act may be appealed to the Board of Selectmen.

5.091 Fees

A schedule of fees for such permits may be established and amended from time to time by the Planning Board.

5.10 ENFORCEMENT

5.101 Designation of the Sign Officer

The Building Inspector (or any other qualified person) shall be appointed by the Selectmen as the Sign Officer. The Sign Officer is authorized to order the repair or removal of any sign and supporting structure which is erected or maintained contrary to this bylaw. Whenever a Sign Officer is designated, the Selectmen should notify the State Outdoor Advertising Board.

5.102 Maintenance and Removal

Every sign shall be maintained in good structural condition at all times. All signs shall be kept neatly painted, including all metal parts and supports thereof that are not galvanized or of rust resistant material. The Building Inspector or the Sign Officer shall inspect and shall have the authority to order the painting, repair, alteration or removal of a sign which shall constitute a hazard to safety, health, or public welfare by reason of inadequate maintenance, dilapidation, or obsolescence.

5.103 Abandoned Signs

Except as otherwise provided in the Section, any sign that is located on property which becomes vacant and is unoccupied for a period of three months or more, or any sign which pertains to a time, event or purpose which no longer applies, shall be deemed to have been abandoned. An abandoned sign is prohibited and shall be removed by the owner of the sign or owner of the premises.

5.104 Dangerous or Defective Signs

No person shall maintain or permit to be maintained on any premises owned or controlled by him any sign which is in a dangerous or defective condition. Any such sign shall be removed or repaired by the owner of the sign or the owner of the premises.

5.105 Removal of Signs by the Building Inspector or Sign Officer

a. The Building Inspector or Sign Officer shall cause to be removed any sign that endangers the public safety, such as an abandoned, dangerous, or materially, electrically, or structurally defective sign, or a sign for which no permit has been issued.

b. The Building Inspector or Sign Officer shall prepare a notice which shall describe the sign and specify the violation involved and which shall state that, if the sign is not removed or the violation is not corrected within 20 days, the sign shall be removed in accordance with the provisions of this section.

c. All notices mailed to sign owners or property owners by the Building Inspector or Sign Officer shall be sent by certified mail. Any time periods provided in this section shall be deemed to commence on the date of the receipt of the certified mail.

d. Any person having an interest in the sign or the property may appeal the determination of the Building Inspector or Sign Officer ordering removal or compliance by filing a written notice of appeal with the Hadley Board of Selectmen within 45 days after the date of mailing the notice, or 45 days after receipt of the notice was not mailed.

5.11 PENALTIES

Violation of any provision of this bylaw or any lawful order of the Sign Officer shall be subject to a fine of not more than $300 per offense. Each day that such violation continues shall constitute a separate offense.

5.12 NON-CONFORMING SIGNS

5.121 Continuance

A non-conforming sign lawfully existing at the time of adoption or subsequent amendment of this bylaw may continue, although such sign does not conform to the provisions of this bylaw, provided that the use, ownership or name of the use does not change.

5.122 Replacement of Non-conforming Signs

a. If the use, ownership, or name of the use for any property with a non-conforming sign changes, the signs for that property shall be replaced with signs conforming to this bylaw.

b. Any sign replacing a non-conforming sign shall conform with the provisions of this Section, and the non-conforming sign shall no longer be displayed.

5.123 Abandonment

If a non-conforming sign associated with a permitted use or structure has been abandoned for no less than six months (i.e., the structure has not been occupied for six months) then the non-conforming sign shall be removed.

APPENDIX D

MODEL OFF-STREET PARKING AND LOADING STANDARDS

MODEL OFF-STREET PARKING AND LOADING STANDARDS

(Based upon excerpts from Westfield Zoning Ordinance, Northampton Zoning Ordinance, and A Unified Development Ordinance, by Michael B. Brough)

E-3 GENERAL PARKING REGULATIONS

3.00 General Parking Regulations

3.001 Off-street parking shall be provided in conjunction with and during the construction, conversion and/or expansion of any structure, as well as upon the expansion of use. In the case of expansion or conversion, these standards shall apply only to the expanded or converted areas.

3.002 In granting special permit for any use, the Special Permit Granting Authority may require off-street parking spaces, standards, or conditions in addition to those set forth in this Bylaw, if it deems necessary for the use.

3.003 Any specific, more stringent provision in any other section of the Town Bylaw relating to parking shall prevail over provisions in this section.

3.01 Parking Areas Design and Location

All new structures and additions or extensions on existing structures shall be provided with off-street parking spaces in accordance with the following specifications:

3.011 Definitions:

a. Driveway -- A space, located on a lot, which is not more than fifteen (15) feet in width for residential uses nor more than twenty-four (24) feet in width for commercial or industrial uses at the lot line, built for access to a garage or off-street parking or loading space.

b. Parking Space -- An off-street space at least nine (9) feet in width and twenty (20) feet in length, excluding the portion of the driveway to such space.

3.012 Location

a. Required parking shall be provided on the same lot with the main use it is to serve or, in Commercial and Industrial Districts, on a lot that is in the same ownership as, and located within, three-hundred (300) feet of the main use. Parking required for two or more buildings or uses may be provided in combined facilities where it is evident that such facilities will continue to be available for the several buildings or uses.

b. Parking areas shall be located to the side or rear of the structure. No parking shall be permitted within the required front yard of the structure.

3.013 Drainage

a. Drainage facilities for each parking area should be designed and constructed to contain stormwater run-off on the premises.

3.014 Screening

a. For five (5) or more vehicles, parking spaces shall be effectively screened with planting or fencing which adjoins or faces the side or rear lot line of a lot situated in any district.

b. Screening may consist of decorative elements such as building wall extensions, plantings, berms or other innovative means, must be maintained in good condition, and no advertising shall be placed thereon. The screening shall be designed so that vehicle sight distance shall not be affected at entrances, exits, or at street intersections.

3.015 Lighting

a. Drives and parking areas shall be illuminated in such a way that there shall be no glare for motorists, pedestrians, or adjoining premises.

3.016 Driveway Access Permits

a. A driveway access permit must be obtained from the (Building Inspector or Public Works Department) for all new or relocated driveways or parking lots.

3.02 Additional Parking Area Standards for Areas with Ten (10) or More Parking Spaces

3.021 Size
In a parking lot or parking building up to sixty percent (60%) of the parking space must be 9 feet by 20 feet in size. The remaining forty percent (40%) may have a reduced parking space size of 9 feet by 16 feet to accommodate smaller cars. The parking space sizes are exclusive of adequate driveways and aisles.

3.022 Surfacing
The area and access driveways shall be surfaced with bituminous or cement concrete material. The location of spaces shall be suitably marked by painted lines or other appropriate markings.

3.023 To the extent feasible, parking areas shall be shared with adjacent uses. This may be accomplished via one of the following methods:

a. Access via a common driveway serving adjacent lots or premises.
b. Access via an existing side street.
c. Access via a cul-de-sac or loop road shared by adjacent lots or premises.

3.024 Parking areas shall be designed so that vehicles cannot extend beyond the perimeter of such area onto adjacent properties or public rights-of way. Such areas shall also be designed so that vehicles do not extend over sidewalks or tend to bump against or damage any wall, vegetation, or other obstruction.

3.025 Landscaping
All open air surface parking area shall be landscaped in the following manner:

a. A landscaped buffer strip at least fifteen (15) feet wide, continuous except for approved driveways, shall be established adjacent to any public road to visually separate parking and other uses from the road. The buffer strip shall be planted with grass, medium height shrubs, and shade trees (minimum 2" caliper, planted at least every 50 feet along the road frontage). At all street or driveway intersections, trees or shrubs shall be set back a sufficient distance from such intersections so that they do not present a traffic visibility hazard.

b. Large parking area, areas providing more than seventy-five (75) parking spaces, shall be subdivided with landscaped islands, so that no paved parking surface shall extend more than 80 feet in width. At least one tree (minimum 2" caliper) per 35 parking spaces shall be provided.

c. Exposed storage areas, machinery, service areas, truck loading areas, utility buildings and structures and other unsightly uses shall be screened from view from neighboring properties and streets using dense, hardy evergreen plantings, or earthen berms, or wall or tight fence complemented by evergreen plantings.

d. All landscaped areas shall be properly maintained. Shrubs or trees which die shall be replaced within one growing season.

3.026 Driveway Location

a. Any portion of any entrance or exit driveway shall not be closer than fifty (50) feet to the curb line of an intersecting street nor shall it be closer than fifty (50) feet to any portion of an existing driveway located in a Business or Industrial District.

b. Any two driveways leading to or from the same street and from the same lot shall note be within thirty (30) feet of each other at their intersections with the front lot line for an interior lot and forty (40) feet for a corner lot.

3.03 Required Minimum Parking Spaces

3.031 For all zoning districts, off-street parking spaces shall be provided for every new structure, the enlargement of an existing structure, or the development of a new land use.

3.032 For all zoning districts, except the Central Business District, in cases of a change in use where the existing use (or in cases of vacancy, the next previous use) did not provide for the number of off-street parking spaces required under this Bylaw, then the proposed use does not have to provide for the number of off-street parking spaces, provided said proposed use does not require any more off-street parking spaces under this Bylaw than the existing use (or in cases of vacancy, the next previous use) would. In situations where the proposed use would require a larger number of off-street parking spaces, the proposed use shall only have to provide an additional number of off-street parking spaces equal to the difference between the number required under this Bylaw for the proposed use.

3.033 All uses shall provide parking spaces adequate to accommodate under all normal conditions the vehicles of occupants, employees, members, customers, clients, residents, and visitors to the premises, as determined by the Planning Board.

3.04 Mixed Uses

In the case of mixed uses, the parking spaces required shall be the sum of the requirements for the various individual uses computed separately. Parking spaces for one use shall not be considered as providing the required parking for any other use.

3.05 Parking Guidelines

The following guidelines may be used by the Planning Board when determining adequate parking:

USES	REQUIRED MINIMUM SPACES
Residential	
Single-Family Dwelling	2 spaces per dwelling unit
Accessory Apartment	2 spaces per dwelling unit, except the one-bedroom units require only one space
Dwelling Conversion	2 spaces per dwelling unit
Home Occupation	1 additional space
Rooming House, Boarding House	1 space for each room rented in addition to dwelling unit requirements
Tourist Home/Bed & Breakfast	2 spaces, plus 1 additional space for each rooming unit
Two- and Three-Family Dwelling	2 spaces per dwelling unit
Multi-family Dwelling limited to persons of low or moderate income or the elderly	1 space per dwelling unit
Multi-family Dwelling	1 space for each bedroom in each unit plus 1 additional space for every 4 units in the development
Congregate Housing for Elderly and Handicapped	1.5 spaces for each sleeping room

USES	REQUIRED MINIMUM SPACES
Business, Commercial, and Industrial Uses	
Automobile retail and service establishment, and other retail and service establishments involving usually extensive display areas, either indoor or outdoor, in relation to customer traffic.	1 space per 800 square feet of gross floor space. In the case of outdoor display areas one for each 1,000 square feet of lot area in such use.
Commercial, retail, and personal service establishments	1 space per each 300 square feet of gross floor area
Miscellaneous professional and business offices, including banks, insurance, and real estate establishments.	1 space per each 300 square feet of gross floor area
Medical/Dentist Office/Clinics	5 spaces per professional space
Kennels, Veterinary Establishments	Parking spaces adequate to accommodate, under normal conditions, the vehicles of occupants, employees, members, customers, clients, and visitors to the premises shall be provided as determined by the Special Permit Granting Authority
Gas/Service Station	3 spaces/service bay, but not less than 1 space/100 square feet of gross floor area
Hotel or Motor Inn	1 space for each sleeping room, plus 1 space for each 500 square feet of public meeting area or restaurant
Funeral Parlors	10 spaces for each reposing room
Drive-in Eating Establishment	1 space per 30 square feet of gross floor area
Restaurants, Taverns	1 space for each 4 seats, 1 space addition for each 2 employees on largest shift
Warehouse or Storage Facility	1 space for 3,000 square feet of gross floor area and/or of lot area in such use
Manufacturing or Industrial Establishment	1 space for each person employed on the largest shift
For all other permitted commercial or industrial uses, including, but not limited to, farm stands, open lot sales, place of the building trades, storage, or distribution plants	Parking spaces adequate to accommodate, under normal conditions, the vehicles of occupants, employees, members, customers, clients, and visitors to the premises shall be provided as determined by the Board of Appeals

USES	REQUIRED MINIMUM SPACES
Government, Institutional, and Public Services Uses	
Indoor place of assembly with fixed seating capacity including theaters, auditoriums, assembly hall, churches, arenas, and convention centers	1 space for every 4 seats
Indoor place of assembly without fixed seats, including libraries, museums, art galleries, government buildings, recreation and community centers membership clubs, skating rinks, or other places of amusement	1 space per each 300 square feet of gross floor area
Bowling Alleys	1 space per 3 lanes
Day Care, Nursery School	1 space per 2 employees
Elementary and Junior High School	1 space for each teacher and employee, including space for the gymnasium or the auditorium, whichever has the larger capacity
High School	1 space for each teacher and employee, plus 1 space per 4 students, including space for the gymnasium or the auditorium, whichever has the larger capacity
Hospital	1.5 spaces per bed at design capacity
Rest, convalescent, and nursing homes and homes for the aged	1 space for each 4 beds
Any use permitted by this Bylaw not interpreted to be covered by this schedule	Closest similar use as shall be determined by the Planning Board

Note 1: Gross floor area shall mean the total area of a building measured by taking the outside dimensions of the building at each floor level intended for occupancy or storage.

Note 2: When the computation of required parking or loading spaces results in the requirement of a fractional space, any fraction of one-half or more shall require one space.

3.06 Off-Street Loading and Unloading Requirements

3.061 Adequate off-street loading and unloading space with proper access from a street, highway, common service driveway, or alley shall be provided whenever the normal operation of any development requires that goods, merchandise, or equipment be routinely delivered to or shipped from that development.

3.062 The loading and unloading area must be of sufficient size to accommodate the numbers and types of vehicles that are likely to use this area, given the nature of the development proposed. The following table indicates the number and size of spaces that generally satisfy the standard set forth in this subsection. However, the Planning Board may require more or less loading and unloading area if it deems such increases or decreases reasonably necessary to satisfy the foregoing standard.

Gross Leasable Number of Spaces*	Area of Building
1,000 - 19,999	1
20,000 - 79,999	2
80,000 - 127,999	3
128,000 - 191,999	4
192,000 - 255,999	5
256,000 - 319,999	6
320,000 - 391,999	7

Plus one (1) space for each additional 72,000 square feet or fraction thereof.

* Minimum dimensions of 12 x 55 feet and overhead clearance of 14 feet from street grade required.

3.063 Loading and unloading areas shall be so located and designed that the vehicles intended to use them can maneuver safely and conveniently to and from a public right-of-way, and complete the loading and unloading operations without obstructing or interfering with any public right-of-way or any parking space or parking lot aisle.

3.064 No area allocated to loading and unloading facilities may be used to satisfy the area requirements for off-street parking, nor shall any portion of any off-street parking area be used to satisfy the area requirements for loading and unloading facilities.

3.065 Whenever there exists a lot with one or more structures on it constructed before the effective date of this chapter, and a change in use that does not involve any enlargement of a structure is proposed for such lot and, the loading area requirements of ths section cannot be satisfied because there is not sufficient area available on the lot that can practically be used for loading and unloading, then the developer need only comply with this section to the extent reasonably possible.

APPENDIX E

TRANSPORTATION BOND ISSUE AMENDMENT

(FOR TRAFFIC IMPACT FEES)

APPENDIX E

TRANSPORTATION BOND ISSUE AMENDMENT (For Traffic Impact Fees)

SECTION 60. Section 21 of Chapter 81 of the General Laws, as so appearing, is hereby amended by striking to the last two sentences and inserting in place thereof the following paragraph.

Any person who builds or expands a business, residential, or other facility intending to utilize an existing access or a new access to a state highway so as to generate a substantial increase in or impact on traffic shall be required to obtain a permit under this section prior to constructing or using such access. Said person may be required by the department to install and pay for, pursuant to a permit under this section, standard traffic control devices, pavement markings, channelization, or other highway improvements to facilitate safe and efficient traffic flow, or such highway improvements may be installed by the department and up to one hundred percent of the cost of such improvements may be assessed upon such person.

APPENDIX F

MODEL PLANNED UNIT DEVELOPMENT ORDINANCE

TEXT OF ARTICLE PROPOSED BY COMMUNITY PLANNING AND DEVELOPMENT COMMISSION FOR TOWN MEETING CONSIDERATION

READING PLANNED UNIT DEVELOPMENT BYLAW
October 19, 1987

"4.9. Planned Unit Development

4.9.1. Statement of Purpose and Authority

The purpose of this Section is to encourage the construction of Planned Unit Developments (PUDs) in designated Districts within the Town. Planned Unit Developments shall:

- permit a mix of land uses, densities, and building types in one development.
- facilitate high quality, integrated planning of large-scale developments beneficial to the Town and constructed in a manner which is highly responsive to specific sites and their surroundings;
- require more rigorous development standards than those found in other zoning districts.

4.9.2. Overlay Districts

Planned Unit Development Districts shall take the form of overlay districts covering all or part of Industrial Districts on the Reading Zoning Map. For any land within a PUD district a Developer may choose to conform either to the zoning regulations which govern the underlying district or to the PUD overlay regulations and procedures set forth by this Section, whose specific provisions shall supersede all other provisions in the Zoning By-laws with respect to the underlying district including, without limitation, use, intensity, dimensions, parking, and site plan review; however the provisions of any other overlay district shall continue to apply.

4.9.2.1. Definitions

The following terms shall have for the purposes of this PUD Bylaw, the meanings hereby assigned to them.

Developer: one or more persons proposing together to develop a Planned Unit Development parcel.

Existing: in existence at the time of filing a complete Preliminary PUD Plan submission.

Floor Area Ratio (or "FAR"): in a PUD, the ratio of total gross building floor area in a PUD to the area of the development parcel. Gross floor area shall be measured from outside wall surfaces and shall include ground floor areas of interior atriums and lobbies, and mechanical and utility space on habitable floors; but shall exclude rooftop space, balconies, elevator pits, or non-habitable areas enclosed by ornamental roofs. Structured parking shall not be counted in the determination of Floor Area Ratio. Areas classified as wetlands in MGL Chapter 131 Section 40, as amended, may not exceed 10% of the development parcel area used to compute FAR.

Minor Street: a street used primarily for access to abutting properties or carrying volumes of traffic less than 10,000 vehicles per average day.

Major Street: a street used for through access and carrying volumes of traffic greater than 10,000 vehicles per average day.

PUD Bylaw: Section 4.9. of the Reading Zoning Bylaws including all subsections thereof.

Site: the development parcel upon which a PUD is proposed.

Structured Parking: in a PUD, a parking garage, or all or part of building floors above or below grade to be used for automobile parking.

4.9.3. Special Permit for Planned Unit Development

The Community Planning and Development Commission (the "CPDC"), as the Special Permit Granting Authority, shall have authority to grant a Special Permit to construct a Planned Unit Development ("PUD") by a vote of at least four members of the five member CPDC. The CPDC shall evaluate proposed PUD projects and require all such projects to conform to the Planned Unit Development requirements, standards, and guidelines set forth in Sections 4.9.4. and 4.9.5. to ensure that the benefits to the Town of a proposed project outweigh any adverse impacts before granting a Special Permit. The CPDC shall adopt and from time to time may amend regulations for the review of PUD Developments as provided in MGL Chapter 40A Section 9.

The CPDC shall interpret all provisions of this PUD Bylaw and all definitions and regulations pertinent thereto and shall provide such interpretations upon request by an applicant for a Special Permit to construct a PUD.

4.9.3.1. Overview of Special Permit Process

A Developer choosing to construct a Planned Unit Development in a PUD District shall apply for a Special Permit with the Community Planning and Development Commission. The Special Permit process shall include:

- Pre-Application Conference. (Optional)
- Preliminary PUD Plan Review.
- Final PUD Plan Review.

4.9.3.2. Pre-Application Conference

A Developer desiring to obtain a Special Permit to construct a Planned Unit Development may request a Pre-Application Conference with the Community Planning and Development Commission prior to submitting an application for the Special Permit.

The purpose of the Pre-Application Conference shall be to discuss both the Developer's intentions and the CPDC's requirements with respect to the proposed PUD. Although not required, this preliminary meeting is desirable, since it should help to clarify many procedural and policy issues.

At the Pre-Application Conference, the CPDC shall discuss with the Developer the process for obtaining a Special Permit to construct a PUD and explain to him/her issues and scopes of studies that should be considered in planning the project, including specific submission items, such as appropriate vantage points for visual analysis and extent of the traffic study area. The CPDC shall review existing studies pertinent to the development and the status of other approved PUDs which should be considered in the Developer's analyses. The Developer may discuss his/her development concept and range of options concerning development. Any statement at the Pre-Application Conference made by either the CPDC or the Developer concerning potential disposition of a Special Permit application or the final form of the development shall not be legally binding.

The Developer shall not be required to present any written, quantitative, or graphic materials at the Pre-Application Conference. The CPDC shall make available to the Developer at this time any forms required for application for a Special Permit to construct a PUD.

4.9.3.3. Preliminary Plan

A Developer who wishes to apply for a Special Permit to construct a PUD shall submit to the CPDC an application including a Preliminary PUD Plan submission for the entire proposed project. If the Developer of the PUD comprises more than one person, all participating persons shall be signatories to the Special Permit application. Two copies of the Preliminary PUD Plan shall remain available to the public during the application process and shall be located in the Town Clerk's Office and Reading Public Library. Any three dimensional model of the proposed project as may be required in the CPDC's regulations shall be displayed at a suitable public building within the Town.

4.9.3.4. Submission Fee

The CPDC shall require a Submission Fee sufficient to cover consultant fees and any other costs associated with reviewing the Preliminary and Final Plan Submissions. The fee amounts shall be as specified in the CPDC's "Fee Schedule for Site Plan Review Process" or in a fee schedule for PUD review specifically adopted and amended by the CPDC from time to time.

4.9.3.5. Preliminary Plan Submission

The Preliminary PUD Plan shall include a complete set of written, quantitative, and graphic materials in the appropriate number according to the PUD Plan Submission Regulations adopted by the CPDC and amended by it from time to time in accordance with MGL Chapter 40A Section 9. The official date of application shall be registered only upon receipt of all materials required by the CPDC.

4.9.3.6. Town Review

Between the date a Developer submits a a complete application for a Special Permit to construct a PUD and the date of the first Public Hearing, the CPDC may distribute the Preliminary PUD Plan for review to Town Departments, elected and appointed Town Boards, and such professional planning, architecture, and engineering consultants as the CPDC deems appropriate. All comments on the Preliminary PUD Plan shall be submitted in writing to the CPDC no later than 5 days before the scheduled date of the first Public Hearing. All written comments shall be made a part of the public record on the application for a Special Permit and shall remain a public record.

4.9.3.7. Public Hearing on Preliminary Plan

Within 65 days of the date of receipt of a complete application for a Special Permit to construct a PUD, the CPDC shall hold a Public Hearing. The purpose of the Public Hearing shall be to solicit public comments concerning the Preliminary PUD Plan.

4.9.3.8. Action on Preliminary Plan

Within 21 days after the close of said Public Hearing, the CPDC shall make a determination concerning the Preliminary PUD Plan. If the CPDC approves the Preliminary PUD Plan or conditionally approves it subject to modifications, then the Developer shall submit a Final PUD Plan, as specified in Section 4.9.3.10. If the CPDC disapproves the Preliminary PUD Plan, then the application for the Special Permit shall be denied, and the CPDC shall state in writing its reasons for denial. If the CPDC makes no decision within the specified time limit, then the Preliminary PUD Plan shall be considered approved, and the Developer shall prepare a Final PUD Plan.

4.9.3.9. Public Improvements Compensation

When reviewing a Developer's Preliminary PUD Plan, the CPDC shall analyze the proposed PUD to determine what if any extraordinary public improvements are necessary to accommodate or service the project. The Developer shall be required by the CPDC to provide such needed improvements at no cost to the Town, or alternatively, to offset the expense of such improvements to be provided by the Town; in this case, an expert engineering consultant to the CPDC shall estimate and, after review by the Reading Public Works Director and Town Engineer, the CPDC shall establish the costs of these improvements and the portion thereof to be borne by the Developer.

4.9.3.10. Submission of Final Plan

The Final PUD Plan shall be a definitive plan of development with design sufficiently developed to provide the basis for the CPDC's determinations regarding the requirements, standards, and guidelines of this PUD bylaw, and shall include a complete set of written, quantitative, and graphic materials in the appropriate number according to the PUD Plan Submission Regulations adopted by the CPDC and amended by it from time to time in accordance with MGL Chapter 40A Section 9. The Final PUD Plan shall be consistent with the approved Preliminary PUD Plan except for changes by amendment or in accordance with conditions attached to the CPDC's approval of the Preliminary PUD Plan, and shall satisfy all such conditions.

The Developer shall submit a Final PUD Plan to the CPDC, no later than 59 days after the close of the Public Hearing referred to in Section 4.9.3.7. Failure to submit a Final PUD Plan within the specified time period shall result in termination of the application for a Special Permit to construct a PUD.

Two copies of the Final PUD Plan shall remain available to the public during the application process and shall be located in the Town Clerk's Office and Reading Public Library. Any three dimensional model of the proposed project as may be required in the CPDC's regulations shall be displayed at a suitable public building within the Town.

4.9.3.11. Additions or Amendments to the Preliminary Plan

Additions or amendments to the Preliminary PUD Plan at this stage shall be deemed either major or minor by the CPDC according to Sections 4.9.3.14. and 4.9.3.15. Minor additions or amendments shall be be authorized by written approval of the CPDC. Major additions or amendments shall be considered as original items to the application and be subject to the procedures specified in Section 4.9.3.13. The CPDC shall decide whether proposed changes are major or minor.

4.9.3.12. Public Hearing on Final Plan

Within 69 days after the close of the Public Hearing referred to in Section 4.9.3.7, the CPDC shall hold a Public Hearing to consider issuance of a Special Permit to construct a PUD in accordance with the Final PUD Plan. Approval of the Special Permit shall be granted upon determination by the CPDC that the Final PUD Plan conforms with and meets the requirements, standards, and guidelines set forth in Sections 4.9.4. and 4.9.5, in a manner consistent with the approved Preliminary PUD Plan, and contains all revisions required by the CPDC in its conditional approval of said Plan. The CPDC may grant the Special Permit with conditions consistent with its approval of the Preliminary PUD Plan, and the conditions shall be agreed to in writing by the Developer before the Special Permit is granted. If not granting a Special Permit to construct a PUD, the CPDC shall make its final decision in writing and shall specify its reasons for denial. If the CPDC makes no decision within the 90 days after the Public Hearing referred to in Section 4.9.3.7, then the Final PUD Plan shall be considered approved and the Special Permit to construct a PUD shall be deemed granted.

4.9.3.13. Amendments to Final Plan

After approval of the Special Permit by the CPDC, the Developer may seek amendments to the Final PUD Plan.

Amendments to the Final PUD Plan shall be considered major or minor. Minor amendments, as specified in Section 4.9.3.14. shall be authorized by written approval of the CPDC. Major amendments, as specified in Section 4.9.3.15. shall be grounds for reconsideration of the Special Permit to construct a PUD and shall be reviewed subject to procedures specified above in Sections 4.9.3.10. and 4.9.3.12, as applicable. Denial of a proposed major amendment shall not invalidate the Special Permit to construct a PUD in conformance with the previously approved Final PUD Plan. The CPDC shall decide whether proposed changes are major or minor, and its decision shall be conclusive.

4.9.3.14. Minor Amendments

Minor Amendments are changes which do not substantially alter the concept of the approved PUD in terms of floor area ratio, use, height, provision of open space, or the physical relationship of elements of the development. Minor amendments shall include, but not be limited to the following: small changes in floor area, mix of uses, site coverage, height, setbacks, or open space; small changes in the location of buildings, open space, or parking; or small changes in the alignment of minor streets on-site.

4.9.3.15. Major Amendments

Major Amendments represent substantial deviations from the PUD concept approved by the CPDC. Major amendments shall include, but not be limited to the following: large changes in floor area, mix of uses, site coverage, height, setbacks, or open space; large changes in the location of buildings, open space, or parking; or large changes in the circulation system, including the number and location of access ways.

4.9.3.16. Development Schedule

The Developer shall begin construction of the PUD within 24 months of the date of the granting of the Special Permit (or, if applicable, following appeal as provided in MGL Chap 40A, Sec. 9) in reasonable conformance with the development schedule submitted with the Final PUD Plan. The CPDC shall grant in writing an extension of this time period of up to an additional 24 months upon determination of good cause. If the Developer fails to commence construction of the PUD within 24 months plus any approved extension period, the Special Permit shall lapse.

4.9.3.17. Phased Development

If a phased development is proposed by the Developer, the Final PUD Plan shall contain all required written, quantitative, and graphic information necessary to evaluate the proposed PUD as a whole and to serve as a basis for granting the Special Permit, plus a final Development Schedule for the completion of the PUD indicating the proposed dates and scope of work to be accomplished in each phase. Site improvements may be phased only in conformity with the phasing schedule included in the approved Final PUD Plan, and only to the extent that all requirements, standards, and guidelines of this PUD bylaw are met in each phase. The initial phase shall include at a minimum the site improvements necessary for one or more buildings and may, at the Developer's option, include one or more buildings.

Deviations from the Final PUD Plan in any phase shall be designated a major or minor amendment to the Final PUD Plan by the CPDC and treated as such according to Section 4.9.3.13.

If the PUD is to be developed in phases, the Developer shall begin the construction of each phase in accordance with the approved Phasing Schedule; however, the CPDC shall grant additional extensions in the timing of phases for up to 24 months each as minor amendments to the Final PUD Plan, upon the determination of a reasonable cause. If the Developer fails to commence construction of a PUD phase within the specified time limit for that phase, including any approved extension period, said failure shall be deemed a major amendment to the Final PUD Plan, and the phase at issue and all subsequent phases which depend upon said phase for their construction and operation in conformance with the Final PUD Plan must be re-approved in accordance with Section 4.9.3.13.

4.9.3.18. Conformity with PUD Plan and Special Permit

The CPDC shall include as a condition to all Special Permits granted for construction of PUDs that no construction of a PUD or any phase thereof may be authorized until the CPDC has reviewed and approved a Design Submission for work to be done, such submission to include architectural, site, and landscape design documents, sufficiently developed to permit review of conformance to the Final PUD Plan and Special Permit conditions, in accordance with the PUD Plan Submission Regulations of the CPDC. If deemed necessary by the CPDC, a Public Hearing may be held for review of any Design Submission. Design Submissions shall be reviewed by the CPDC solely for conformity with the Final PUD Plan, with Special Permit conditions, and, only to the extent not already reviewed and approved, with the requirements, standards, and guidelines applicable to the construction of the phase in question. If the CPDC makes no decision upon a Design Submission within 90 days of receipt of all required materials, said Special Permit condition shall be deemed to be satisfied regarding said PUD or phase thereof.

The CPDC may adopt regulations requiring one or more of the following in amounts and durations sufficient to guarantee that all committments in the approved PUD Plan to provide public improvements or to take other actions are properly completed: performance bonds, deposit of money or negotiable securities with the Town, or a satisfactory agreement with a lending institution to retain funds pending completion of such improvements or actions.

If, for any PUD or construction phase thereof, the CPDC finds that either the Developer has failed to begin development within the specified time period, including any approved extension period, or that the Developer is not proceeding in conformity with the Special Permit, then the CPDC may, after 60 days from written notice (and any additional period which the CPDC may deem necessary so as to provide the Developer reasonable opportunity to cure any deficiencies), revoke the Special Permit as it applies to the phase of construction at issue, and/or require that the

Developer amend the Final PUD Plan subject to procedures specified in the Amendments to Final PUD Plan, Section 4.9.3.13. If the CPDC revokes the Special Permit for the PUD then the Final PUD Plan shall be null and void as it applies to the phase of construction at issue and all subsequent phases which depend upon said phase for their construction and operation in conformance with the Final PUD Plan. The provisions of this paragraph are additional to the Reading Building Inspector's powers of enforcement under the Zoning Bylaws and Massachusetts State Building Code.

Upon satisfaction of all applicable Special Permit conditions, the CPDC shall issue a certificate of compliance for one or more PUD phases. No certificate of occupancy shall be issued for a given PUD phase until a certificate of compliance has been issued.

4.9.4. Use and Dimensional Requirements

The following paragraphs shall serve as the basic Use and Dimension Requirements to which all PUD projects shall adhere within each PUD overlay district and shall be used by the Community Planning and Development Commission to evaluate any proposed project.

4.9.4.1. Parcel Size and Eligibility

The minimum size of a PUD development parcel shall be 80,000 square feet. Development parcels of 500,000 square feet or larger shall be termed "large PUDs" and qualifying parcels smaller than 500,000 square feet shall be termed "small PUDs".

A development parcel may consist of land in more than one ownership, provided that all lots comprised by the parcel lie entirely within the PUD overlay district and are contiguous. Lots separated by a minor street or right-of-way as defined in Section 4.9.2.1. may be considered contiguous for this purpose.

Proposed developments may include pre-existing buildings provided that all PUD requirements are satisfied by each new or existing building and for the PUD as a whole. More than one principal building may be located on a lot, Section 5.2.8. not withstanding.

4.9.4.2. Permitted Uses

Planned Unit developments may contain two or more of the following uses subject to the findings of the CPDC as to net benefit and adverse impacts of the proposed PUD:

- Office use;
- Research and Development, comprising office use and electronic or computer laboratories, but not ancillary manufacturing, and excluding activities which possess, use, or transfer licensed nuclear materials (including source materials, special nuclear materials, or by-product materials as defined in Title 10, Chapter 1, of the Code of Federal Regulations, Part 20, "Standards for Protection Against Radiation"), genetically engineered or biohazard materials, or other toxic or hazardous materials;
- Full-Service Hotel;
- Restaurant, lounge, places of assembly, recreational and/or retail uses within the above, but not in freestanding structures;
- Parking (including structured parking) to accommodate the above;
- Residential uses within 200 feet of Residence Districts;
- Open space.

All other uses are excluded from a Planned Unit Development.

4.9.4.3. Intensity of Use

The permitted intensity of use in a PUD development shall be expressed as the ratio of total gross building floor area to the area of the development parcel (Floor Area Ratio or "FAR"). Gross floor area shall be measured from outside wall surfaces and shall include ground floor areas of interior atriums and lobbies, and mechanical and utility space on habitable floors; but shall exclude rooftop space, balconies, elevator pits, or non-habitable areas enclosed by ornamental roofs. Structured parking shall not be counted in the determination of Floor Area Ratio. Areas classified as wetlands in MGL Chapter 131 Section 40, as amended, may not exceed 10% of the development parcel area used to compute FAR.

The basic allowable FAR for PUD developments is 0.50 for small PUDs and 0.55 for large PUDs.

4.9.4.4. Discretionary Intensity and Height Determination

The CPDC may approve additional FAR above the basic ratio for small or large PUDs and additional height above the basic limit if it finds in applying the criteria of Section 4.9.4.5. that the net benefits to the Town are thereby increased.

The CPDC may in no case increase the permitted Floor Area Ratio beyond 0.65 for small PUDs and 0.70 for large PUDs, nor may it increase permitted height beyond the maximum limitations of Section 4.9.4.6.

4.9.4.5. Criteria for Determining Increased Development Intensity and Height

The basic allowable intensity of use may be increased if the CPDC finds that provision of one or more of the following public improvements or amenities provides substantial public benefits. The additional building area permitted should be commensurate with the quality and value to the Town of one or more of the following improvements and amenities:

- significant improvement of the environmental condition of a site;
- provision of or contribution to off-site public facility improvements which enhance the general condition of the district and surrounding areas;
- dedication of open space or recreational facilites for use by the general public;
- provision of open space beyond 15% of the parcel area, or of outdoor recreational facilities for use by a PUD project's occupants or by the general public, and of sufficient size and quality to offset fully any adverse aesthetic effects of proposed parking garages;
- work with other owners and tenants of a PUD overlay district to develop and achieve district-wide and adjacent neighborhood improvement goals;
- provision of public art, distinctive and appropriate design, or other amenities that a Developer may propose which will provide unique advantages to the general public or contribute to achieving Town-wide improvement goals;
- provision of low or moderate income or elderly housing within the PUD in conformance with this PUD Bylaw and/or off site in a manner acceptable to the Reading Housing Authority.

4.9.4.6. Dimensional Requirements

Each PUD development shall be governed by the dimensional requirements of this section. These requirements apply only to the development parcel as a whole, not to individual lots within the PUD.

4.9.4.6.1. Height

The basic maximum height within a PUD shall be the lesser of 84 feet or six stories. Height shall be measured in the manner defined in Section 2.0. of this bylaw.

The maximum height of residential structures within a PUD shall not exceed 40 feet or three stories. If 10 percent of such units are restricted for low or moderate income or elderly housing, the maximum height of all proposed residential structures shall not exceed 50 feet or four stories.

In a large PUD, the CPDC may in its discretion and in accordance with Section 4.9.4.4. approve building heights up to 168 feet or 12 stories, whichever is less, subject to the following limitations:

- o Buildings with over eight stories may not contain in aggregate more than one third of the total gross floor area of the PUD;
- o At least one third of the gross floor area of the PUD shall be contained in buildings with six stories or lower;
- o Buildings shall be oriented and arranged to provide the best overall appearance from important vantage points, which may be identified in a Pre-Application Conference.
- o The increase in permitted height may not have any significant adverse effect on the PUD overlay district, adjacent residential districts or abutting property.

4.9.4.6.2 Setbacks and Buffers

All non-residential buildings shall be located at least 50 feet from the boundary of the PUD overlay district.

All non-residential buildings shall be located at least 150 feet from residential structures in existence at the time of Preliminary PUD Plan submission.

All residential buildings within a PUD shall be at least 30 feet from the parcel boundary but no further than 200 feet from a Residential District.

There shall be a landscaped and/or naturally vegetated buffer at least 50 feet wide where the development parcel abuts residential properties. Alternatively, where residential uses occur in the PUD, a landscaped and/or naturally vegetated buffer at least 30 feet wide shall be provided.

Along major arterial streets, as defined in Section 4.9.2.1, buildings shall be set back at least 75 feet (or the height of the building if greater than 75 feet), and a landscaped and/or naturally vegetated buffer at least 50 feet wide shall be provided along such major streets, except where site entrances occur.

No buffer may contain parking or paved surfaces except for pedestrian paths and site entrances.

Between 9 AM and 3 PM (EST) from February 21 to October 21, no building may cast a shadow on any residential structure in existence at the time of Preliminary PUD Plan submission.

4.9.4.7. Required Open Space

A PUD shall set aside at least 15% of its total parcel area as required open space; additional open space will be considered in proposed development intensities in excess of the basic permitted FAR and height.

Required Open Space shall have a minimum dimension of 20 feet (which may include the dimension across a water body) and shall be open to tenants and customers within the PUD; access by the general public is desirable and will be considered in proposals for additional development intensity and height.

A PUD which includes residential use shall delineate the area of residential use and shall set aside at least 25% of the site within this area as open space available to and usable by the occupants of the residential units.

Required Open Space may include:

- o Wetlands and water bodies, including the normal water surface area of detention or retention ponds up to 50% of the required open space area;
- o Vegetated/landscaped area, including buffers;
- o Pedestrian paths, sidewalks, and covered walkways;
- o Public plazas and hard surfaced recreation areas.

4.9.5. Environmental Standards and General Development Guidelines

In addition to conforming to the Use and Dimensional Requirements governing PUD overlay districts, approval of a Special Permit to construct a PUD shall be granted also upon determination by the Community Planning and Development Commission that a proposed PUD satisfies the following criteria. In any disapproval of a PUD, the CPDC shall state in writing the specific reasons for its finding that the proposed PUD does not satisfy one or more of the criteria. Mitigation measures proposed by the Developer, at no cost to the Town, shall be considered in making these determinations.

(1) That it conforms as appropriate to the existing policy plans established by the Town Meeting, Selectmen, and CPDC for the specific area of the Town in which the proposed PUD is located.

(2) That there is no significant adverse effect under any of the following:

(a) quality of site design, building design, and landscaping as they affect occupants of the proposed development, the PUD overlay district, adjacent residential districts, and the Town of Reading as a whole;

(b) traffic flow and safety in the context of this and other proposed developments in the PUD overlay district and sensitive nearby areas, which may be identified in the scope of a state Environmental Impact Report and/or in a Pre-Application Conference;

(c) water quality, air quality, wetlands, and the natural environment;

(d) provision of open space;

(e) adequacy of utilities and other public works and impact on existing public facilities within the Town; and

(f) potential fiscal impact to the Town of Reading.

(3) That approval of the proposed PUD provides benefits to the Town which outweigh all adverse effects, as evaluated under the above criteria.

4.9.5.1. Environmental Standards

A PUD shall conform in each phase to all applicable federal, state, and local laws and regulations (including all such regulations established by the U.S. Environmental Protection Agency and the Massachusetts Department of Environmental Quality Engineering) regarding the environment such as those concerning noise, air quality, wetlands, water quality, and protection from flooding.

4.9.5.2. Transportation, Site Circulation, and Parking

4.9.5.2.1. Significant Traffic Impact: The CPDC may not approve a proposed PUD which in its opinion has significant adverse traffic impact, as determined following examination by the CPDC of the Developer's traffic analysis and any other traffic analysis of the affected area available to the CPDC which is germane to the proposed PUD. In making its determination, the CPDC shall consider the feasibility of any capacity improvements and mitigating measures proposed to be provided by the Developer at no cost to the Town. In making such determinations, the full traffic impact of all other previously approved Preliminary or Final PUD Plans shall be considered, regardless of project phasing. Without limitation, the determination of significant adverse impact shall consider traffic volumes, speeds, and resulting levels of service on residential streets, approaches to the site of the proposed PUD, and other key locations, all of which may be identified in a Pre-Application Conference.

4.9.5.2.2. Transportation Plan: The PUD Developer shall prepare an acceptable Transportation Plan aimed at reducing traffic congestion through means such as spreading peak hour traffic, encouraging public transportation use and ride sharing. The Plan shall include transportation goals and specific means to achieve them, such as employment of a transportation coordinator to facilitate proposed actions; provision of shuttle bus service to public transportation; van-pooling programs; and flex-time requirements. The Plan shall to the extent feasible include provisions to establish a mechanism for participation in the Plan by subsequent owners and tenants of the PUD, and the Developer shall guarantee sufficient financing of the Transportation Plan to initiate and continue its operation through the first year of PUD occupancy. Developers may arrange to coordinate their plans and share in the cost of such measures on an area-wide basis.

4.9.5.2.3. Site circulation shall meet accepted design standards for private automobiles, service vehicles, and emergency vehicles.

It is highly desirable to consolidate access to PUDs in a small number of widely spaced principal access points, which may be driveways or Town-accepted side streets lying entirely within the PUD overlay district. Principal access should be consolidated in as few locations as possible and, if feasible, it is desirable for adjacent developments to share principal access. Principal access points generally should be spaced and aligned or alternated according to good traffic engineering practice, and should be signalized if necessary.

4.9.5.2.4. Parking should be be provided in at least the following ratios through each phase of development, unless the CPDC determines that a larger number of spaces is dictated by special circumstances:

- For office and research and development uses, and uses ancillary to them, three parking spaces per 1000 gross square feet of floor area;

- For hotels and customary uses within them, one parking space per rentable room or suite;

- For residential uses, one and a half parking spaces per unit.

Ancillary uses should not normally require additional parking spaces.

Loading requirements shall be determined based on activity analysis provided by the Developer.

Parking stall size shall be at least 8.5 by 18 feet, with provision for larger spaces as required by the CPDC to accommodate short term parking, handicapped, and large vehicles.

Parking lots shall be landscaped in conformance with Section 4.9.5.5.6.

4.9.5.2.5. Roadways within a PUD shall be constructed in conformance with standards established by the Reading Department of Public Works.

The design of the overall circulation pattern shall be prepared in accordance with the principles and concepts established in "Recommended Practices for Subdivision Streets" prepared by the Institute of Traffic Engineers (1965).

4.9.5.3. Public Works Standards

All on-site and off-site improvements, which include the installation of utilities, public lighting, sewers, and other public improvements, shall be constructed according to the criteria of the Reading Public Works Department and other appropriate departments.

4.9.5.4. Control of Runoff and Flooding

The Developer shall demonstrate that, as compared with the situation that would exist on the site without the PUD, no phase of the proposed PUD will result in an increase in the peak rate of storm run-off at the parcel boundary for the PUD as a whole for the 25, 50, and 100 year design storms, and that there will be no net loss in flood storage capacity for the 100 year design storm. In making such determinations, any state or local orders or requirements that apply (for example, required closure of landfills or existing Orders of Conditions under the Wetlands Protection Act) shall be assumed in the calculations of runoff and flood storage without the PUD, but alternative forms of development shall not be assumed.

4.9.5.5. Design Quality

Project design shall be reviewed by CPDC with input from Town officials, the review consultant(s) employed by the CPDC, and other property owners in the PUD overlay district. The following are to be interpreted as guidelines to be applied flexibly by the CPDC and as appropriate to the situation under review, including factors such as foundation conditions and other extraordinary constraints. These guidelines apply to all site improvements, buildings and structures, including structured parking facilities.

4.9.5.5.1. Building placement:

- Provide and preserve attractive views from major vantage points, especially from major thoroughfares and residential neighborhoods.
- Avoid regular spacings and building placements that will be viewed as continuous walls from important vantage points, which may be identified in a PUD Pre-Application Conference.

4.9.5.5.2. Building Massing/Articulation:

- Avoid unbroken building facades longer than 100 feet.
- Provide human scale features, especially at street level.
- Avoid unarticulated and monotonous building facades and window placement.

4.9.5.5.3. Roofline Articulation:

- Provide a variety of building heights and varied roofline articulation.
- Provide step backs above the fourth level on buildings within 100 feet of major streets.
- In PUDs comprising three or more buildings, and where buildings over six stories in height are proposed, locate taller buildings away from major streets and residential uses.

4.9.5.5.4. Building Materials:

- Use materials and building treatments that reduce the visibility of buildings from distant vantage points and are compatible with backgrounds and surroundings.
- Use materials and colors compatible with other quality buildings of similar scale in the area.

4.9.5.5.5. Landscape Treatment:

- All open areas within a PUD should be landscaped in an appropriate manner utilizing both natural and manmade materials such as grass, trees, shrubs, attractive paving materials, and outdoor furniture.
- Deciduous trees should be planted along new and existing streets.
- Plazas, arcades, malls, and similar amenities are encouraged.
- Outdoor lighting should be considered in the landscaping plan and should be designed to complement both manmade and natural elements of the PUD and adjacent areas.
- Intensive, high quality landscaping should be provided within the PUD where it abuts major streets and on internal drives to achieve a boulevard character;
- Landscape treatment should be emphasized on site boundaries facing residential districts.

4.9.5.5.6. Parking Lots

- Parking lots should use landscaping and terracing to break up large areas of pavement and to enhance the appearance of such areas to the greatest extent feasible, but no less than 5% of the total parking lot area.
- Most parking lot landscaping should have a minimum dimension of five feet.
- Trees and shrubs should be used to the maximum extent feasible.

4.9.5.5.7. Pedestrian Amenities:

- Emphasize pedestrian amenities such as covered walkways, landscaped open space, drop-off areas, and recreation facilities such as pedestrian and/or jogging paths along on-site watercourses or which follow a PUD parcel boundary.
- Tree lined or otherwise appropriately landscaped pedestrian walkways should link together areas designated as open space within the boundaries of a site and wherever possible with designated open space throughout a PUD overlay district.

4.9.5.5.8. Utilities:

- To the extent feasible, all utilties should be located underground.

4.9.5.6. Signage

Signage shall be consistent with Section 6.2 of the Reading Zoning Bylaws, except that no portion of a sign may extend above the roof line of any building."

APPENDIX G

ACCESS MANAGEMENT TECHNIQUES

SOURCE OF DATA: U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION, "ACCESS MANAGEMENT FOR STREETS AND HIGHWAYS", 1982.

Table VI.1. Access Management Techniques

CATEGORY A

LIMIT NUMBER OF CONFLICT POINTS

A-1: Install median barrier with no direct left-turn access
A-2: Install raised median divider with left-turn deceleration lanes
A-3: Install one-way operations on the highway
A-4: Install traffic signal at high-volume driveways
A-5: Channelize median openings to prevent left-turn ingress and/or egress maneuvers
A-6: Widen right through lane to limit right-turn encroachment onto the adjacent lane to the left
A-7: Install channelizing islands to prevent left-turn deceleration lane vehicles from returning to the through lanes
A-8: Install physical barrier to prevent uncontrolled access along property frontages
A-9: Install medial channelization to control the merge of left-turn egress vehicles
A-10: Offset opposing driveways
A-11: Locate driveway opposite a three-leg intersection or driveway and install traffic signals where warranted
A-12: Install two one-way driveways in lieu of one two-way driveway
A-13: Install two two-way driveways with limited turns in lieu of one standard two-way driveway
A-14: Install two one-way driveways in lieu of two two-way driveways
A-15: Install two two-way driveways with limited turns in lieu of two standard two-way driveways
A-16: Install driveway channelizing island to prevent left-turn maneuvers
A-17: Install driveway channelizing island to prevent driveway encroachment conflicts
A-18: Install channelizing island to prevent right-turn deceleration lane vehicles from returning to the through lanes
A-19: Install channelizing island to control the merge area of right-turn egress vehicles
A-20: Regulate the maximum width of driveways

CATEGORY B

SEPARATE BASIC CONFLICT AREAS

B-1: Regulate minimum spacing of driveways
B-2: Regulate minimum corner clearance
B-3: Regulate minimum property clearance
B-4: Optimize driveway spacing in the permit authorization stage
B-5: Regulate maximum number of driveways per property frontage
B-6: Consolidate access for adjacent properties
B-7: Require highway damages for extra driveways
B-8: Buy abutting properties
B-9: Deny access to small frontage
B-10: Consolidate existing access whenever separate parcels are assembled under one purpose, plan, entity, or usage
B-11: Designate the number of driveways regardless of future subdivision of that property
B-12: Require access on collector street (when available) in lieu of additional driveway on highway

CATEGORY C

LIMIT DECELERATION REQUIREMENTS

C-1: Install traffic signals to slow highway speeds and meter traffic for larger gaps
C-2: Restrict parking on the roadway next to driveways to increase driveway turning speeds
C-3: Install visual cues of the driveway
C-4: Improve driveway sight distance
C-5: Regulate minimum sight distance
C-6: Optimize sight distance in the permit authorization stage
C-7: Increase the effective approach width of the driveway (horizontal geometrics)
C-8: Improve the vertical geometrics of the driveway
C-9: Require driveway paving
C-10: Regulate driveway construction (performance bond) and maintenance
C-11: Install right-turn acceleration lane
C-12: Install channelizing islands to prevent driveway vehicles from backing onto the highway
C-13: Install channelizing islands to move ingress merge point laterally away from the highway
C-14: Move sidewalk-driveway crossing laterally away from highway

CATEGORY D

REMOVE TURNING VEHICLES FROM THE THROUGH LANES

D-1: Install two-way left-turn lane
D-2: Install continuous left-turn lane
D-3: Install alternating left-turn lane
D-4: Install isolated median and deceleration lane to shadow and store left-turning vehicles
D-5: Install left-turn deceleration lane in lieu of right-angle crossover
D-6: Install medial storage for left-turn egress vehicles
D-7: Increase storage capacity of existing left-turn deceleration lane
D-8: Increase the turning speed of right-angle median crossovers by increasing the effective approach width
D-9: Install continuous right-turn lane
D-10: Construct a local service road
D-11: Construct a bypass road
D-12: Reroute through traffic
D-13: Install supplementary one-way right-turn driveways to divided highway (noncapacity warrant)
D-14: Install supplementary access on collector street when available (noncapacity warrant)
D-15: Install additional driveway when total driveway demand exceeds capacity
D-16: Install right-turn deceleration lane
D-17: Install additional exit lane on driveway
D-18: Encourage connections between adjacent properties (even when each has highway access)
D-19: Require two-way driveway operation where internal circulation is not available
D-20: Require adequate internal design and circulation plan

A-8: INSTALL PHYSICAL BARRIER TO PREVENT UNCONTROLLED ACCESS ALONG PROPERTY FRONTAGES

The installation of a physical barrier along a single property or many adjacent frontages is a design technique for controlling access on all kinds of highways. The control of access can be accomplished by erecting fences, barriers, plantings, or curbs adjacent to the roadway or shoulder. Possibilities exist for the construction of rock walls, rail fences, or other structures that are compatible with the aesthetics of the area. Curbing, however, is the most common method.

This design technique reduces the total area of conflict by controlling and defining driveway openings. The frequency of conflicts is reduced because the number of possible conflict points is limited to the defined driveway openings.

Warrants

This technique is warranted on all highways where open access exists and where the highway ADT exceeds 10,000 vpd.

Where open access highways exist, this technique is warranted when the highway ADT exceeds 10,000 vpd and the level of development is greater than 45 driveways per mile. For consideration at single properties only, total driveway ADT should exceed 500 vpd. High accident rates involving the open access situation will also warrant this technique.

Design

Regulation of uncontrolled access along property frontages can be accomplished by several methods. Included in this list are:

- Barrier
- Curbing
- Shrubbery
- Railing

Of the above, curbing is widely used due to: (1) ease of installation; (2) low maintenance; and (3) effectiveness. Care however must be exercised when placing curb to review not only the impact on control of access, but also its affect on the site and roadway drainage.

A-17: INSTALL DRIVEWAY CHANNELIZING ISLAND TO PREVENT DRIVEWAY ENCROACHMENT CONFLICTS

This access control measure involves the construction of a driveway median island to control ingress and egress vehicle maneuvers. The technique can be applied either to existing driveways or in the permit authorization stage.

The technique will reduce head-on encroachment conflicts between driveway ingress and egress vehicles. Ingress and egress traffic will be directed to separate sides of the driveway median island. Some increases in single-vehicle accidents can be expected due to driveway vehicles striking the island.

Warrants

This technique is applicable on all types of highways and for driveways with two-way operations. A history of driveway head-on accidents between opposing vehicles or between entering and parking vehicles would warrant this treatment. Highway traffic volume should exceed 5,000 vpd with speeds ranging from 25-45 mph. At least 500 vpd or 100 vehicles during the peak hour should utilize the driveway before constructing medial channelization.

Design

Installation of a driveway median should be made to prohibit encroachment by opposing vehicles. The width of the median should be from 4 feet to 10 feet; the length from 25 feet to 120 feet. The offset of the island with respect to the through lanes should be at least 5 feet. If construction takes place on an existing driveway, adequate space for the safe operation of driveway vehicles must be achieved. Figure A.17 presents minimum geometric considerations for successfully implementing this technique.

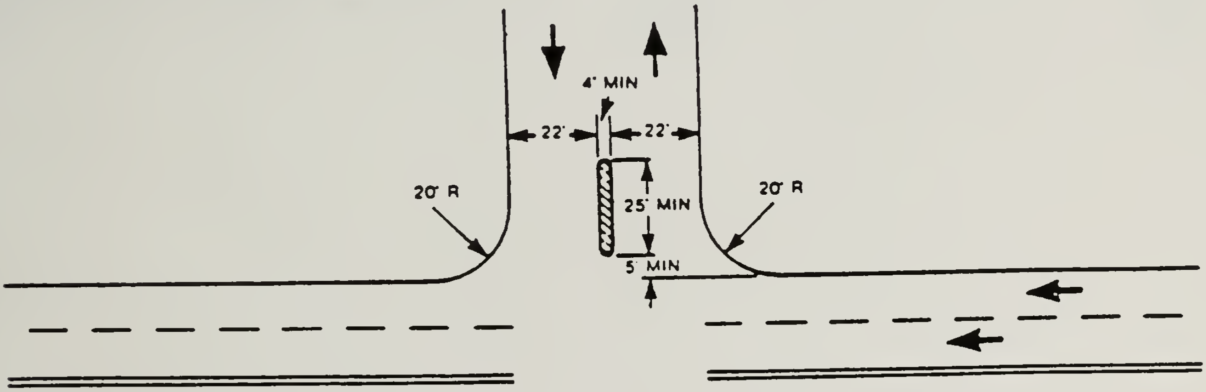


FIGURE A.17. DRIVEWAY MEDIAN CHANNELIZING ISLAND

A-20: REGULATE THE MAXIMUM WIDTH OF DRIVEWAYS

This is a regulatory technique aimed at reducing conflict areas by defining the maximum width of driveway openings on the highway. The maximum width is a function of the types of vehicles using a facility as well as their entering or exiting speeds. This technique is applicable at a point location or as a standard for all driveways. Curbing is usually used to define the extent of a driveway opening.

The reduction in potential conflict areas is expected to be accompanied by a reduction in accident frequencies and severities. No tradeoffs are anticipated by regulating maximum driveway widths.

Warrants

This technique is warranted on all highway types where excessively large driveway widths exist. Highway volumes should exceed 5,000 vpd, and highway speeds should be less than 45 mph. Driveway volumes should exceed 250 vpd. The technique is also warranted for general application along highways that experience high accident rates associated with undefined driveways.

Design

Maximum driveway width is a function of design parameters appropriate to the expectant vehicle usage. Consideration must be given to highway operating conditions, volume, geometry, sight distance, angle of intersection, and alignment (vertical and horizontal) as described in Chapter VII. Information contained in several techniques should be consulted in the initial phase.

B-1: REGULATE MINIMUM SPACING OF DRIVEWAYS

The minimum spacing of driveways is a regulatory method used by many agencies to regulate the frequency of access points along highways. This technique can be implemented at existing locations or during the driveway permit authorization stage. Strategies for achieving this objective at existing driveways include closing of driveways or closing and relocating driveways.

This technique indirectly reduces frequency of conflict by separating adjacent, basic conflict areas and limiting the number of basic conflicts points per length of highway. The technique is expected to reduce the severity of rear-end conflicts as it allows more deceleration distance and perception time for motorists. Some tradeoffs may be realized by increasing average delay and rear-end conflicts at driveways as a result of increasing the average volume per access point.

Warrants

This access control technique is generally warranted for all types of arterials where conflict areas overlap and delays are excessive. Highways with volumes greater than 5,000 vpd and speed greater than 25 mph are candidates for consideration. Also, the technique is warranted on arterials which have a level of development ranging from 30-60 driveways per mile and frontage widths greater than 100 feet. Minimum driveway volumes greater than 200 vph at peak periods are necessary for warranting this technique.

Design

Table B.1 contains desirable separation distances applicable to driveways on all types of roadways.

TABLE B.1. DESIRABLE SEPARATION OF ADJACENT DRIVEWAYS

Highway Speed	Minimum Spacing
20 mph	85
25 mph	105
30 mph	125
35 mph	150
40 mph	185
45 mph	230
50 mph	275

B-2: REGULATE MINIMUM CORNER CLEARANCE

This access control standard regulates the distance between a crossroad intersection and the nearest driveway location. In this text, corner clearance is defined as the distance, measured along the back of the arterial curb, from the nearest edge of a driveway to the nearest edge of the intersection.

This technique moves the basic driveway conflict area away from the vicinity of an intersection by regulating the distance from the driveway to the intersection. The major effect is that the minimum spacing of access points is increased, resulting in larger stopping sight distances and driver perception times. An additional effect is that driveway vehicles will be delayed less by standing queues at signal-controlled intersections. A possible tradeoff is that access to some corner commercial properties may be partially or totally denied.

Warrants

This technique may be applied on all types of highways where corner lot driveways create conflict and delay problems to through and driveway traffic. Highway ADT and speed should exceed 5,000 vpd and 25 mph, respectively. Severe limitations on corner frontage widths may render this technique impractical at locations with frontage widths less than 100 feet.

Design

This technique is aimed at minimizing driveway/intersection conflicts by preventing blockage of driveways upstream of an intersection due to standing traffic queues. Minimum driveway setback distances should take into consideration typical traffic queue lengths while permitting sufficient movement to driveway vehicles. In rural areas, the corner clearance from the end of the radius should be a minimum of 20-40 feet; in urban areas, 10-20 feet.

B-3: REGULATE MINIMUM PROPERTY CLEARANCE

The regulation of minimum property clearance distances is an access control standard that helps increase the minimum spacing of access points. Property clearance is the distance, measured along the arterial curb, from the extended property line to the nearest edge of the driveway.

The technique is expected to reduce deceleration requirements on the highway. Conflicts will be reduced because drivers are allowed more perception time between successive conflict areas.

Warrants

This technique may be applied on all highway types where insufficient property clearance contributes to conflicts and delays to the through and driveway traffic. Highway ADT and speed should exceed 5,000 vpd and 25 mph.

Design

Table B.1 contains recommended clearances between driveways.

B-4: OPTIMIZE DRIVEWAY SPACING IN THE PERMIT AUTHORIZING STAGE

This is a general operating practice that maximizes the spacing of adjacent driveways during the permit authorization stage. The technique is intended to supplement the operational benefits expected from Technique B-5, "Regulate Minimum Driveway Spacing."

This technique indirectly reduces the frequency of conflicts by separating adjacent conflict areas and limiting the number of basic conflict points per length of highway. The implementation of the technique is expected to reduce the severity of conflicts as it allows more deceleration distance and perception time between driveways.

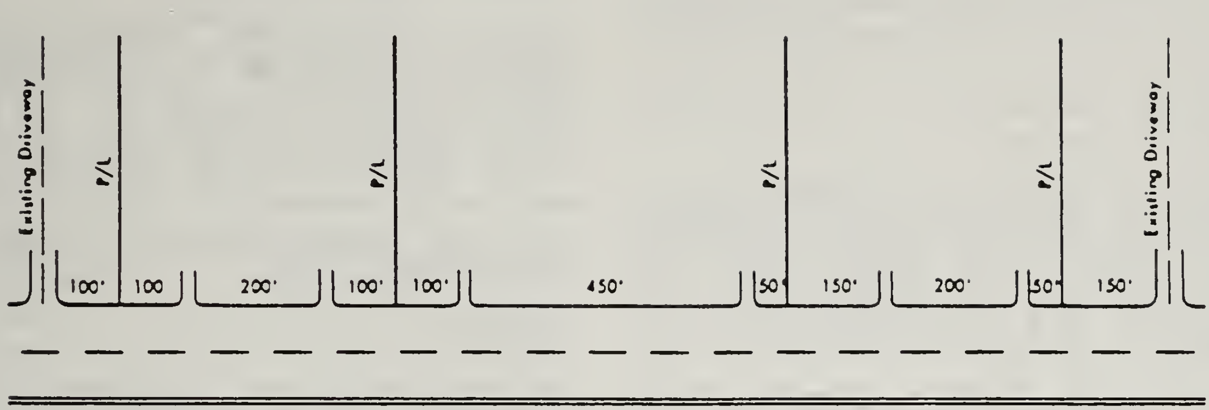
Warrants

This technique is warranted for all types of highways. Its application is limited to the permit authorization stage. Highways with volumes and speeds greater than 5,000 vpd and 25 mph, respectively, are prime candidates. Also, the technique is warranted on arterials which have an anticipated level of development range from 30-60 driveways per mile. Minimum anticipated driveway volumes of 1,000 vpd are required.

Design

This technique is aimed at maximizing spacing between adjacent driveways along an arterial. Application of this technique is intended to supplement the information contained in Technique B.1. Figure B.4.1 contains two arrangements: a.) minimum non-optimized driveway spacing and b.) optimized driveway spacing.

a -- Minimum Driveway Spacing



b -- Optimized Arrangement

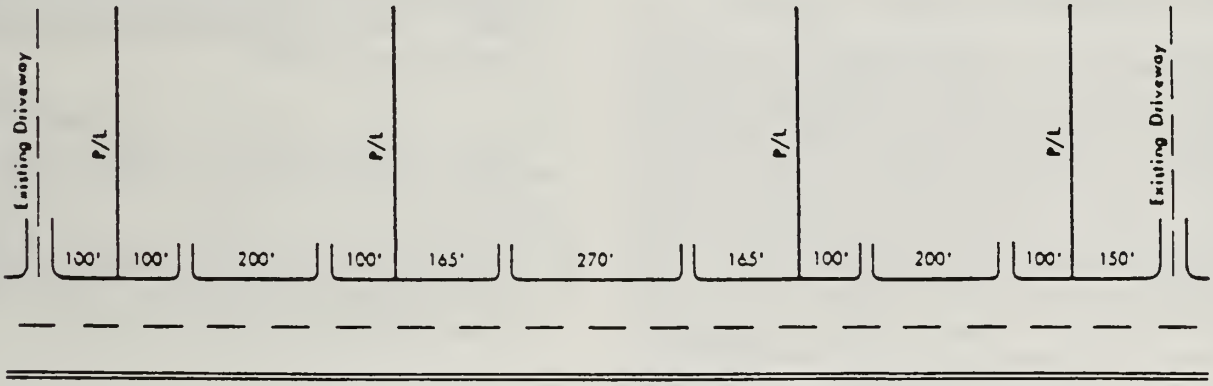


FIGURE B.4.1. OPTIMIZED DRIVEWAY PLACEMENTS

B-5: REGULATE MAXIMUM NUMBER OF DRIVEWAYS PER PROPERTY FRONTAGE

This general access control standard limits the number of driveways per property relative to the length of available frontage. It is a route alternative that minimizes the number of driveways per length of highway.

Generally, regulating the maxmium number of driveways per property frontage limits the number of conflict areas and provides turning drivers more time and distance to execute their maneuvers.

Basic conflict points will be reduced proportionately to the reduction in driveways. This results in a reduction in the frequency of conflicts. The severity of conflicts should also decrease because deceleration requirements are lessened.

If, because of the application of this technique, traffic volume increases significantly at existing driveway locations, an increase in the frequency of conflicts at these locations is likely. Also, regulating the number of driveways permitted for a specific frontage length could have a significant impact on the business activity at that location. These problems should be considered before denial for an additional driveway is given or before an existing driveway is closed.

Warrants

The application of this access control measure is warranted on all existing arterial highways or as a standard for all new facilities. For implementation on existing highways, highway volumes and speeds should exceed 5,000 vpd and 30 mph. Total access volumes to a property should exceed 500 vpd.

Design

The allowable number of driveways typically follows the recommendations outlined below:

- Normally, only one driveway is permitted for residential usage and no more than two permitted for non-residential usage.
- If property frontage exceeds 600 feet, an additional driveway may be permitted.
- Development may be restricted to a single ingress/egress point if served by an adequate collector road.

B-6: CONSOLIDATE ACCESS FOR ADJACENT PROPERTIES

This general operating practice encourages adjacent property owners to construct joint-use driveways in lieu of separate driveways. Strategies for implementing this technique include closing existing driveways or authorizing joint-use driveways.

A prime example of this technique is the neighborhood shopping center, where access to several properties is provided by a few access points. The feasibility of this technique is viewed primarily at the permit-authorization stage. The joint driveway will cause a reduction in the concentration of driveways along an arterial. The reduction in driveway concentrations is expected to be accompanied by a reduction in the frequency and severity of conflicts.

Warrants

This technique is warranted on all types of highways. Highway ADT should exceed 10,000 vpd and highway speeds should be greater than 35 mph. Driveway pairs with more than 50 vehicles using each driveway per hour will be good candidates for this technique.

Design

The physical means by which access can be consolidated between two adjacent properties involves construction of a joint use driveway between the two properties. It is recommended that the joint-use driveway be owned by both property owners. That is, the driveway should be located precisely straddling the property line dividing the two establishments. This practice will not enable either owner the opportunity to deny or restrict access to his neighbor's property.

The resulting joint-use parking area should be accompanied by an efficient internal circulation plan. Internal circulation is discussed in detail in connection with Technique C-20, Require Adequate Internal Design and Circulation Plan. Consideration should also be given the driveway design parameters of return radii, offset distances, alignment angles and land widths, which are discussed in Chapter VII.

B-7: REQUIRE HIGHWAY DAMAGES FOR EXTRA DRIVEWAYS

This general access control policy requires the abutting property owner or developer to pay for highway damages if he desires an additional driveway beyond the number considered suitable and sufficient for access. The additional driveways are permitted only if they conform to other established driveway regulations. The compensation should reflect the increased operating and accident costs assumed by the motoring public. Payment for damages can be required either on existing facilities or for sites being developed.

The policy of requiring highway damages must be established by statute, code, ordinance or other means in order to be enforceable. Such a policy should help to discourage the construction of additional driveways. The average spacing of access points would be increased and driveway maneuvers will create less interference with through vehicle movement, thereby achieving better compatibility between accessibility and traffic operations.

Conflict points are indirectly reduced if the technique is a successful deterrent to additional driveways. A reduction in the frequency of conflicts would follow. The increased separation distance between basic conflict areas would increase perception time and lessen deceleration requirements, thus decreasing the severity of conflicts.

Warrants

Requiring highway damages for extra driveways must be applied in the planning stage. This technique is applicable to higher volume highways using specified standards for the number of driveways permitted for specific frontage widths.

Design

The guidelines for implementation of this technique will derive from the basic driveway spacing policy of the highway agency. Chapter VII provides guidelines.

B-9: DENY ACCESS TO SMALL FRONTAGE

The denial of access to small frontages is a regulatory policy that prohibits direct access to the arterial highway. Legal problems are usually encountered and are concerned with the availability of suitable and sufficient access. Compensation is required if suitable and sufficient access cannot be provided.

This technique, as in other regulatory driveway location techniques, separates basic conflict areas by limiting the number of access points. The frequency and severity of conflicts will be reduced because conflict areas are further separated, and driver perception times and distances are increased. The number of frontages which are denied access affects the degree to which the frequency and severity of conflicts is changed.

B-10: CONSOLIDATE EXISTING ACCESS WHENEVER SEPARATE PARCELS ARE ASSEMBLED UNDER ONE PURPOSE, PLAN, ENTITY, OR USAGE

This is a general operating practice that requires specific changes on commercial sites when they are assembled for development or redevelopment. The consolidation is accomplished by voiding existing driveway permits upon alteration of the property functions. The new permit authorization depends on the developer's plans to use some existing driveways and close or relocate other driveways.

The objective of this technique is to increase average spacing of access points along the highway. The consolidation of driveways reduces the number of access of points and thereby increases the spacing of driveways. The increase in driveway spacing provides motorists of turning vehicles more time and distance to properly execute their maneuvers. The severity of conflicts should decrease because deceleration requirements are lessened.

B-12. REQUIRE ACCESS ON COLLECTOR STREET (WHEN AVAILABLE) IN LIEU OF ADDITIONAL DRIVEWAYS ON HIGHWAY

This access control technique is aimed at maintaining the average spacing of driveways by locating additional driveways on collector streets instead of on the arterial highway when the existing driveways on a property are utilized to their capacity. This technique will reduce conflict frequency and severity by diverting some driveway vehicles to the collector street location where traffic volumes and speed are lower.

C-5: REGULATE MINIMUM SIGHT DISTANCE

This regulatory policy is designed to control driveway location by imposing minimum sight distance standards for driveways. The policy takes effect by closing and relocating existing driveways or by regulating new driveways in the permit authorization stage. Regulation of sight distance is generally more applicable to suburban-rural locations.

The technique enables the driver of a vehicle, which is on the driveway, to see a sufficient distance in both directions along the highway and to enter the highway without creating a hazardous situation. The increased sight distance also decreases the speed differential between highway and driveway vehicles by allowing the through driver more perception time, which helps to reduce maximum deceleration requirements. These conditions should lead to a reduction in the severity of conflicts.

Warrants

The application of this technique should always be considered in the permit authorization stage. Application to existing highways is appropriate where high-accident rates are associated with sight distance restrictions.

Design

Chapter VII provides recommended sight distances applicable to this technique.

D-18: ENCOURAGE CONNECTIONS BETWEEN ADJACENT PROPERTIES

This driveway operation technique is aimed at removing turning vehicles or queues from the through lanes. The strategy for achieving this objective is to encourage adjacent property owners to permit property-to-property movements away from the highway.

A prime example of this access control measure is the neighborhood shopping center, where several adjacent properties are served by one open parking lot area. The patrons frequenting nearby establishments do not need to exit onto the highway and then enter the neighboring driveway.

Highway conflicts will be reduced because the highway will no longer be used in traversing from one property to the next.

Warrants

This technique is warranted on all highway types. Of particular interest are adjacent properties with small frontage widths. All highway ADT volumes and highway speeds from 25 to 45 mph will exist at the candidate locations. Driveway volumes should exceed 500 vpd.

Design

This technique is intended to serve adjacent properties through use of common access points. Thought must be given to internal circulation and storage space for driveway vehicles as well as geometric layout and existing highway operation.

APPENDIX H

HIGHWAY CORRIDOR DESIGN CONCEPTS

SOURCES: METROPOLITAN AREA PLANNING COUNCIL,
“STRIPS AND CENTERS”, 1979 TRI-COUNTY REGIONAL
PLANNING COMMISSION, LANSING, MICHIGAN

FIGURE 11

SUBURBAN INTERMITTENT STRIP-LINEAR DEVELOPMENT OPTION

EXPAND COMMERCIAL ALONG ROAD, BUT NOT IN STRIP FORM.

- ▨ COMMERCIAL
- ░ LOW DENSITY RESIDENTIAL
- ☐ VACANT LAND
- ▦ NEW COMMERCIAL

NOTE: THIS MAP IS A REPRESENTATION OF AN EXISTING STRIP MODIFIED TO SHOW A TYPICAL EXAMPLE.

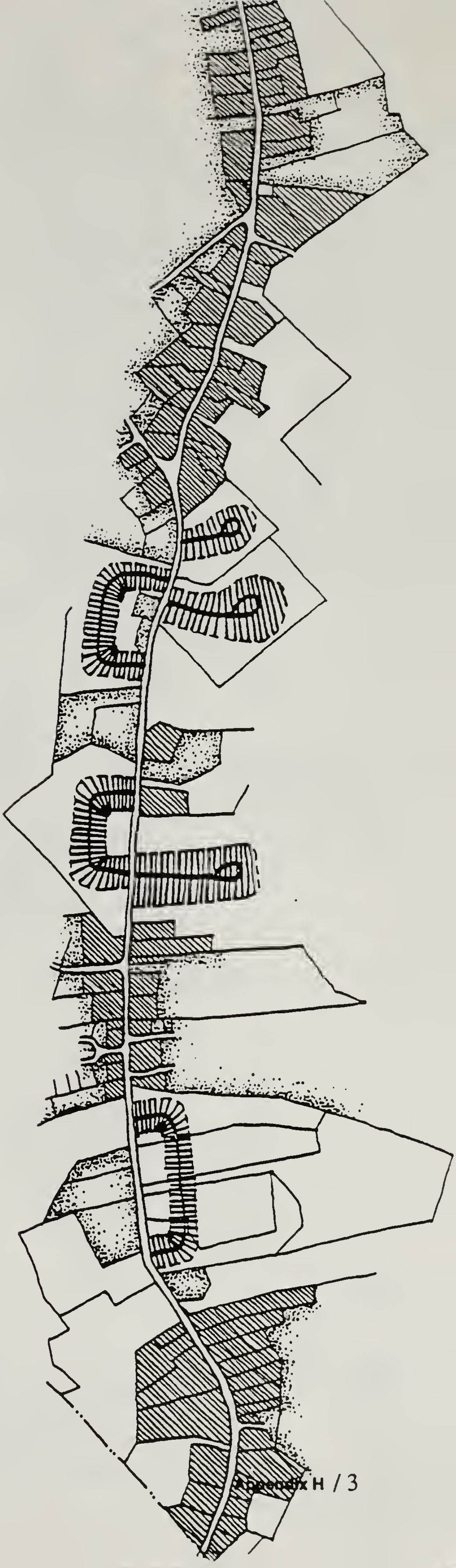


FIGURE 13

SUBURBAN INTERMITTENT STRIP-NODAL DEVELOPMENT OPTION

ENCOURAGE LOCATION OF NEW COMMERCIAL DEVELOPMENT ADJACENT TO EXISTING STRIPS, BUT NOT AS EXTENSIONS OF THEM.

▩ COMMERCIAL
░ LOW DENSITY RESIDENTIAL
□ VACANT LAND
▨ NEW COMMERCIAL

NOTE: THIS MAP IS A REPRESENTATION OF AN EXISTING CORRIDOR, MODIFIED TO SHOW TYPICAL EXAMPLE.

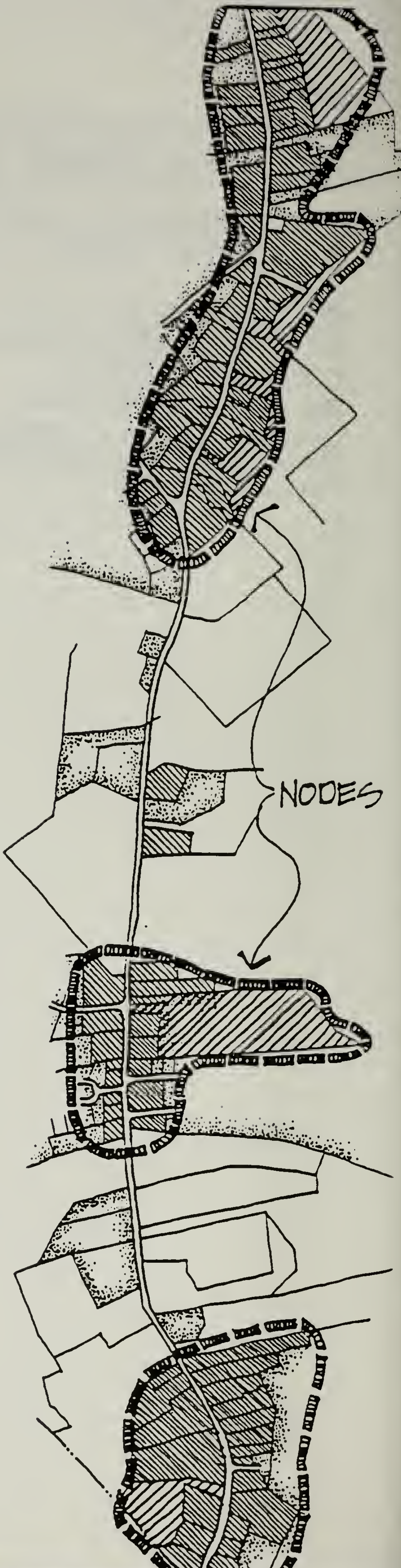
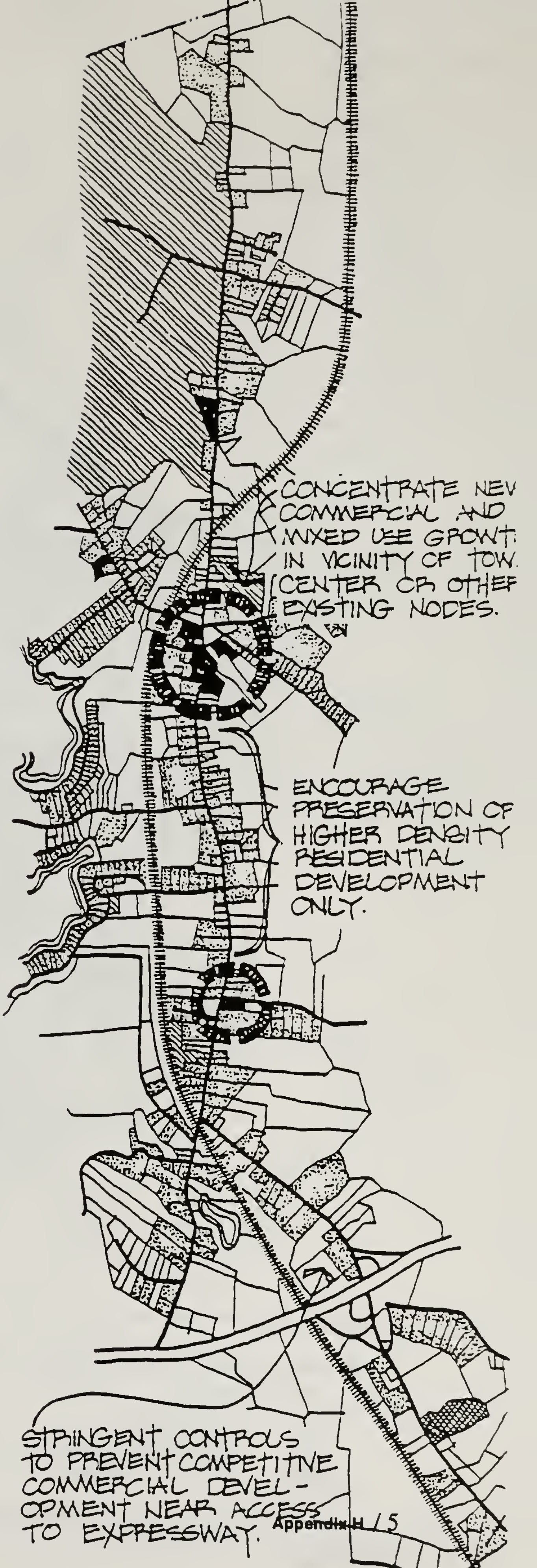


FIGURE 17

RURAL CENTER DOMINANT CORRIDOR-NODAL DEVELOPMENT OPTION

- ■ COMMERCIAL
- ▩ INDUSTRIAL
- ▧ PUBLIC INSTITUTIONAL
- ▨ RESIDENTIAL
- ☐ OPEN/AGRICULTURAL

NOTE: THIS MAP IS A REPRESENTATION OF AN EXISTING CORRIDOR, BUT MODIFIED TO SHOW A TYPICAL EXAMPLE



CONCENTRATE NEW COMMERCIAL AND MIXED USE GROWT IN VICINITY OF TOW CENTER OR OTHER EXISTING NODES.

ENCOURAGE PRESERVATION OF HIGHER DENSITY RESIDENTIAL DEVELOPMENT ONLY.

STRINGENT CONTROLS TO PREVENT COMPETITIVE COMMERCIAL DEVELOPMENT NEAR ACCESS TO EXPRESSWAY.

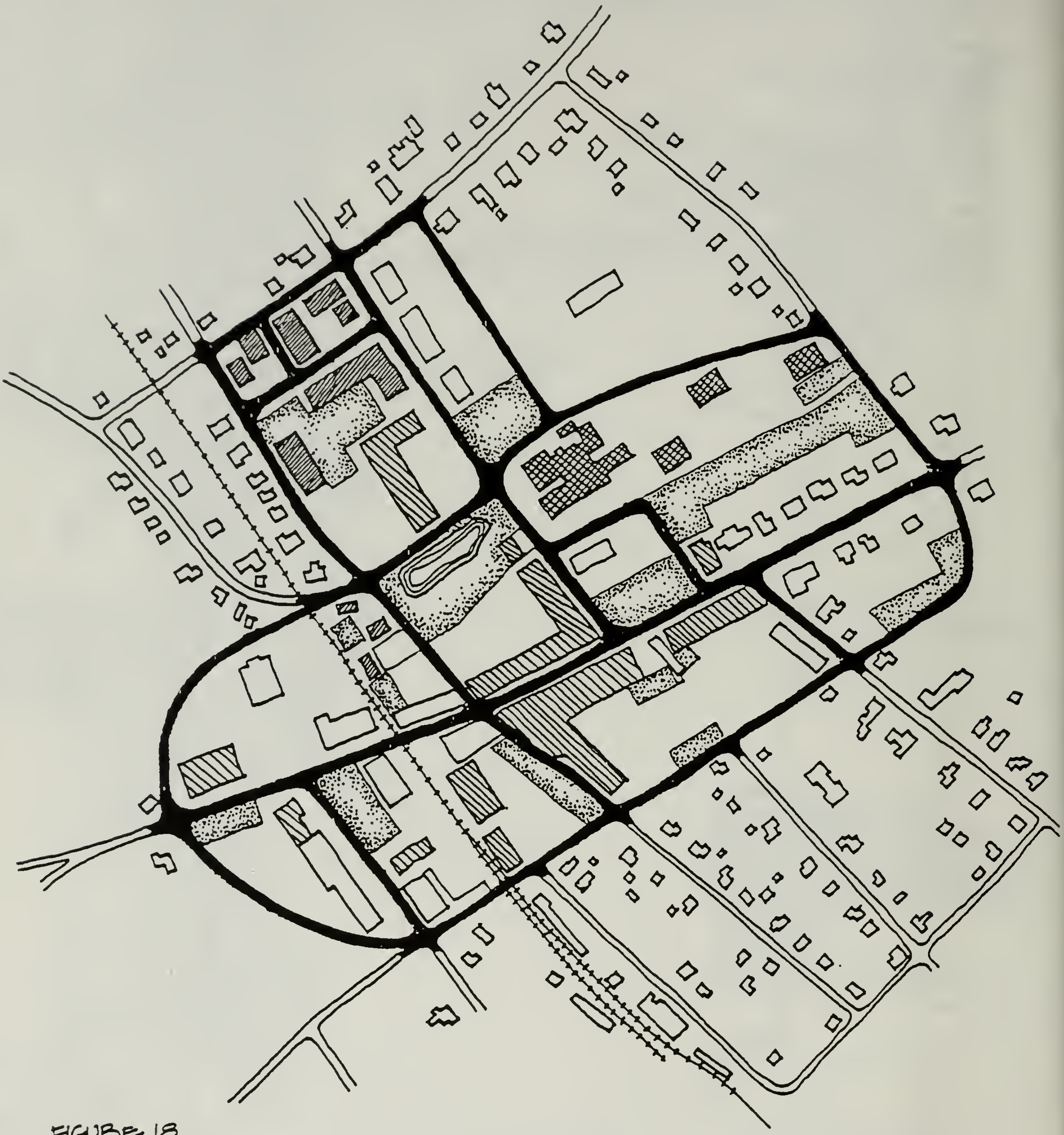


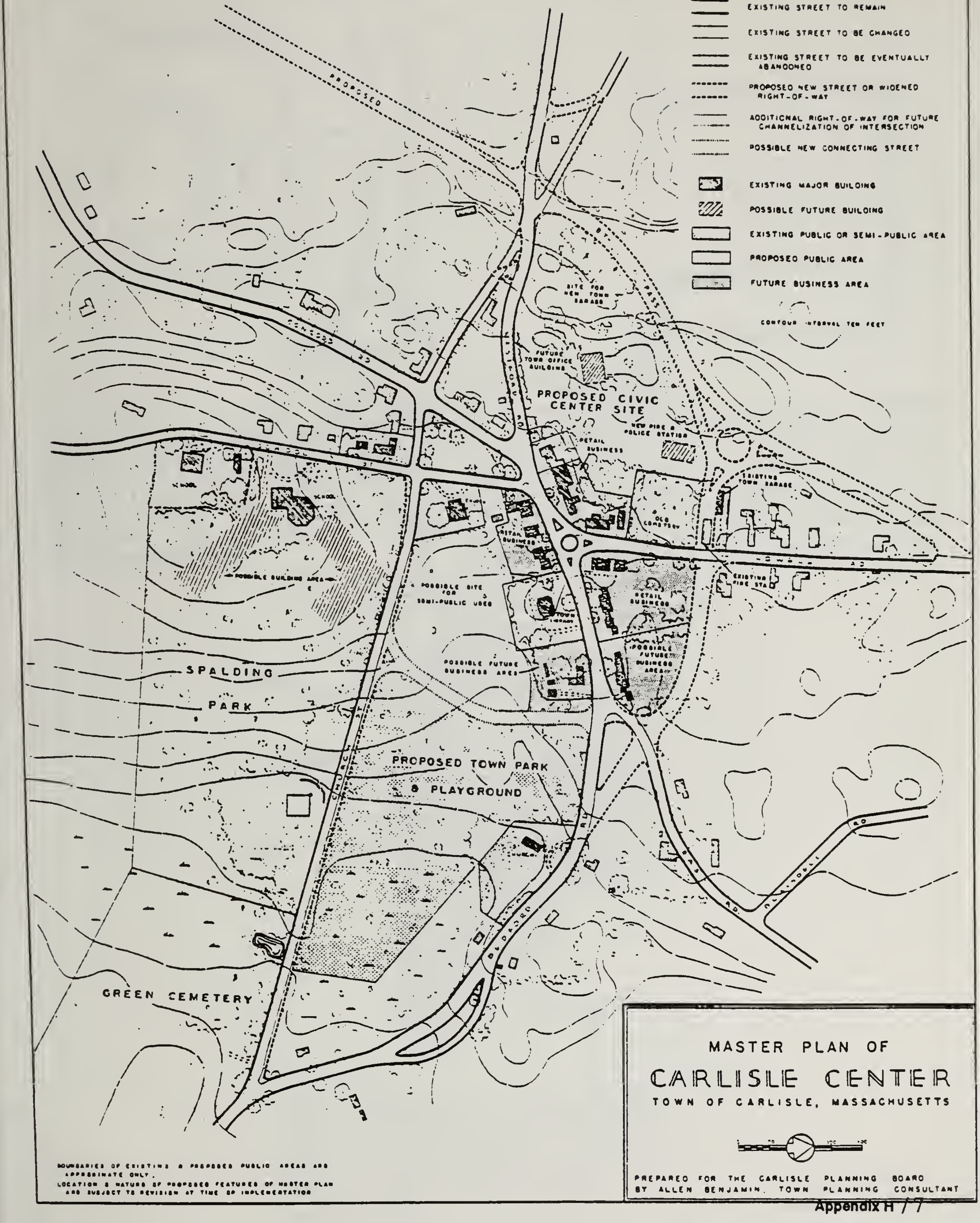
FIGURE 18

PLAN FOR MEDFIELD TOWN CENTER, SHOWING PROPOSED LOOP ROADS

▧ COMMERCIAL
▦ INDUSTRIAL
▨ APARTMENTS
░ OPEN SPACE

METCALF & EDDY, ENGINEERS AND PLANNERS, AUGUST 1964

FIGURE 20


EXISTING STREET TO REMAIN
EXISTING STREET TO BE CHANGED
EXISTING STREET TO BE EVENTUALLY ABANDONED
PROPOSED NEW STREET OR WIDENED RIGHT-OF-WAY
ADDITIONAL RIGHT-OF-WAY FOR FUTURE CHANNELIZATION OF INTERSECTION
POSSIBLE NEW CONNECTING STREET
EXISTING MAJOR BUILDING
POSSIBLE FUTURE BUILDING
EXISTING PUBLIC OR SEMI-PUBLIC AREA
PROPOSED PUBLIC AREA
FUTURE BUSINESS AREA
CONTOUR INTERVAL TEN FEET
PROPOSED
BY-PASS
CONCORD RD
SITE FOR NEW TOWN GARAGE
FUTURE TOWN OFFICE BUILDING
PROPOSED CIVIC CENTER SITE
NEW FIRE & POLICE STATION
RETAIL BUSINESS
EXISTING TOWN GARAGE
OLD CEMETERY
LOWELL RD
EXISTING FIRE STA
SCHOOL
SCHOOL
POSSIBLE BUILDING AREA
POSSIBLE SITE FOR SEMI-PUBLIC USES
RETAIL BUSINESS
TOWN LIBRARY
RETAIL BUSINESS
POSSIBLE FUTURE BUSINESS AREA
POSSIBLE FUTURE BUSINESS AREA
SPALDING PARK
PROPOSED TOWN PARK & PLAYGROUND
CHURCH ST
BEDFORD RD
RD
GREEN CEMETERY
BOUNDARIES OF EXISTING & PROPOSED PUBLIC AREAS ARE APPROXIMATE ONLY.
LOCATION & NATURE OF PROPOSED FEATURES OF MASTER PLAN ARE SUBJECT TO REVISION AT TIME OF IMPLEMENTATION

MASTER PLAN OF

CARLISLE CENTER

TOWN OF CARLISLE, MASSACHUSETTS

PREPARED FOR THE CARLISLE PLANNING BOARD
BY ALLEN BENJAMIN, TOWN PLANNING CONSULTANT

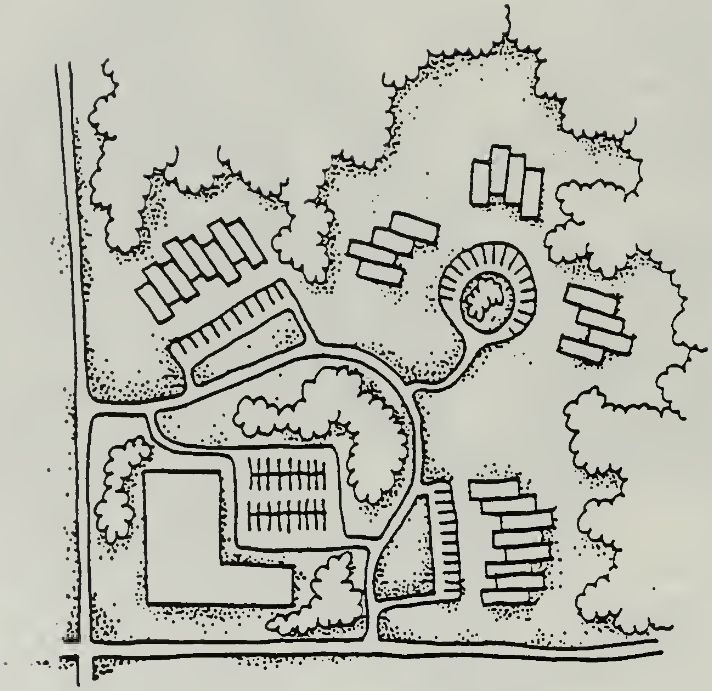


FIGURE 21

EXAMPLE OF A SMALL RURAL NODE AT AN INTERSECTION WITH COMMERCIAL AND HIGHER DENSITY RESIDENTIAL USES

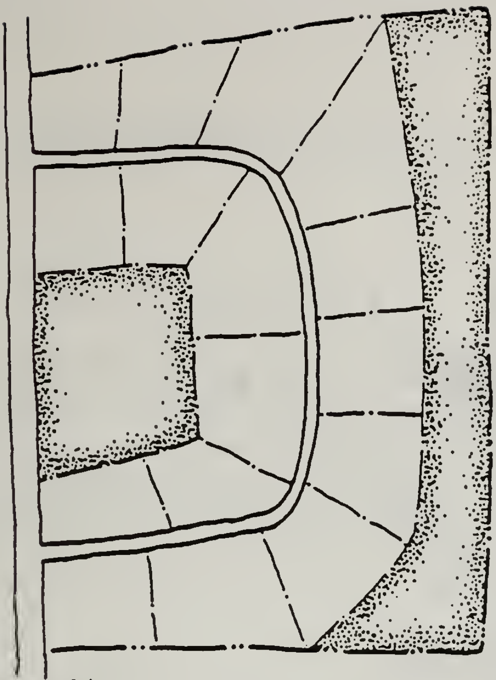


FIGURE 31

COMMERCIAL CLUSTER DEVELOPMENT WITH LOOP ROAD. OPEN SPACE MAINTAINED ON MAIN ROAD FRONTAGE AND AS A BUFFER FOR SURROUNDING NEIGHBORHOODS.

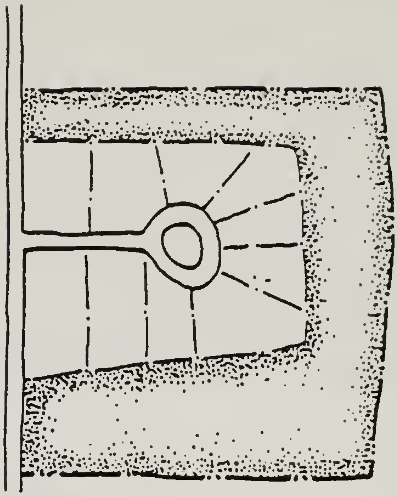


FIGURE 32

COMMERCIAL CLUSTER DEVELOPMENT WITH CUL-DE-SAC. OPEN SPACE MAINTAINED ON MAIN ROAD FRONTAGE AS A BUFFER FOR SURROUNDING NEIGHBORHOODS AND AS BREAK IN DEVELOPMENT ON MAIN ROAD.

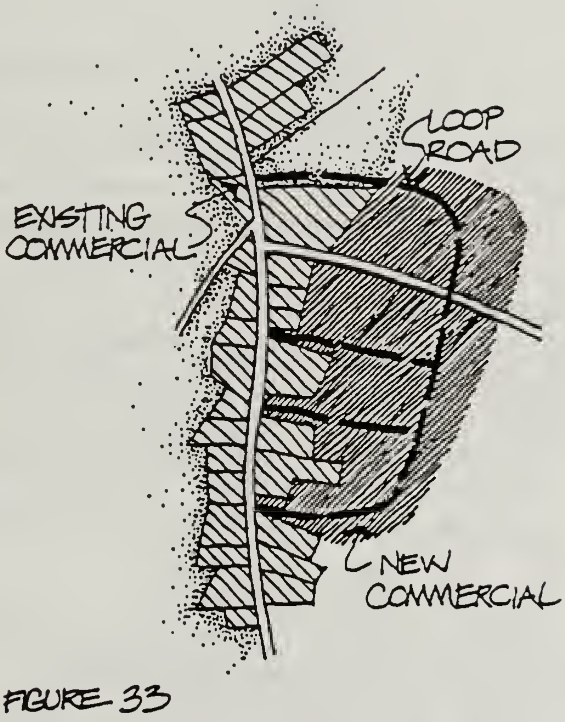


FIGURE 33

NEW COMMERCIAL DEVELOPMENT CAN BE CONTAINED IN NODES. NEW LOOP ROAD PROVIDED BY DEVELOPER OR BY THE COMMUNITY.

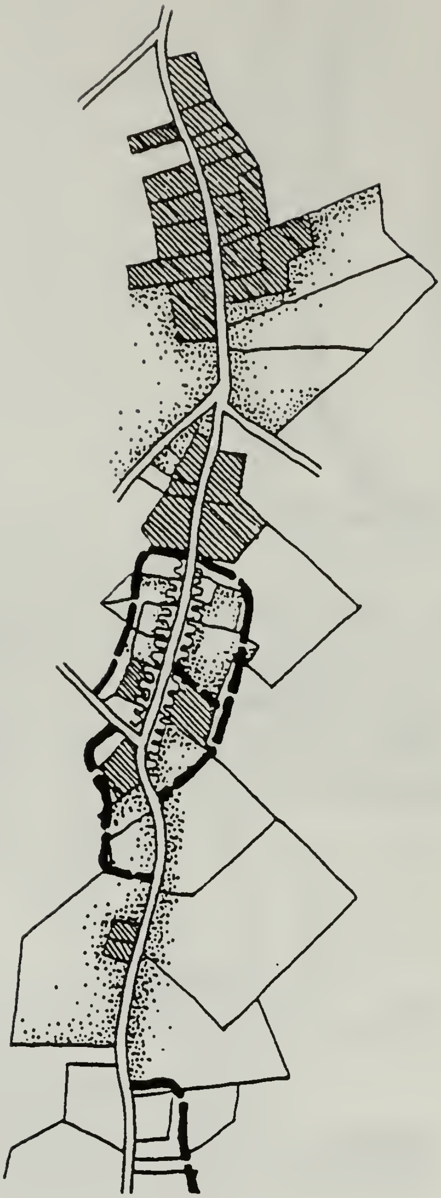


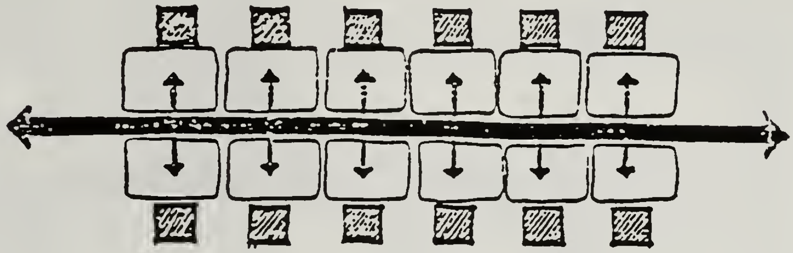
FIGURE 34

ALTERNATIVE ACCESS FROM NEW LOOP ROADS FOR EXISTING SMALL FRONTAGE LOTS TO IMPLEMENT EXPANDED STRIP OR LINEAR DEVELOPMENT OPTIONS

▨ COMMERCIAL
▒ LOW DENSITY RESIDENTIAL
☐ VACANT LAND
≋ ACCESS TO MAIN ROAD ELIMINATED
⊏ NEW LOOP ROADS

Driveway Alignment:

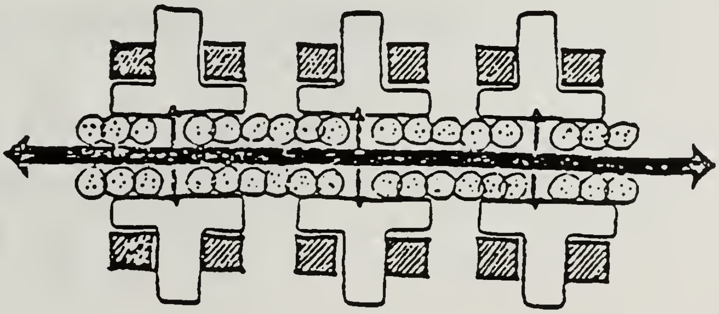
A first step in improving the strip may be to align the driveway cuts. This makes a modest reduction in driveways by limiting to each business one defined cut and reduces some confusion. Most accidents are rear-end collisions involving two cars, one car which is entering or exiting from abutting properties in a random pattern. The introduction of order will reduce the danger.



A

Shared Driveways and Parking:

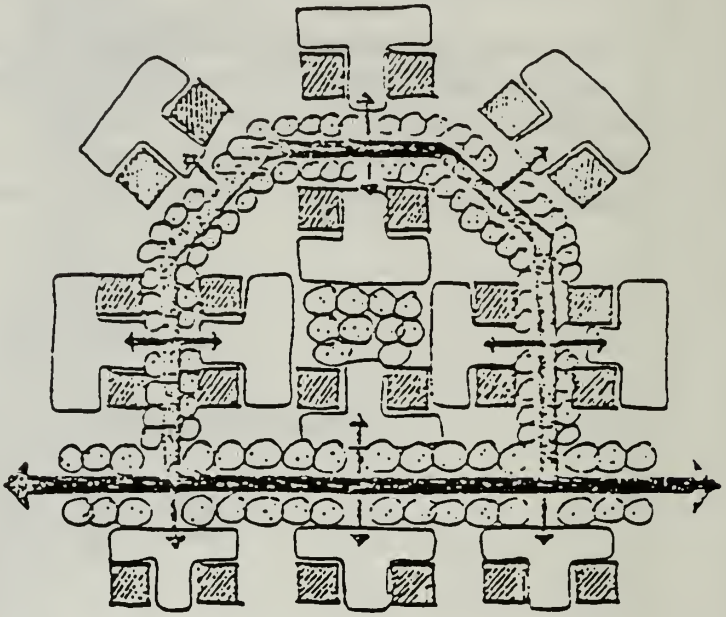
Shared driveways and parking areas increase safety beyond the improvements of Concept A and also improve appearance. Sharing access points may result in a fifty percent or greater reduction in driveway cuts. Shared parking areas may permit a reduction up to thirty percent because complementary uses require less total area than each use individually. For example, the peak hours of a restaurant and a grocery store offset each other. The result of these reductions is greater uninterrupted areas which may be landscaped and fewer hard-topped or paved areas with their runoffs. The scheme below permits landscaping along the frontage where previously there were curb cuts.



B

Cluster:

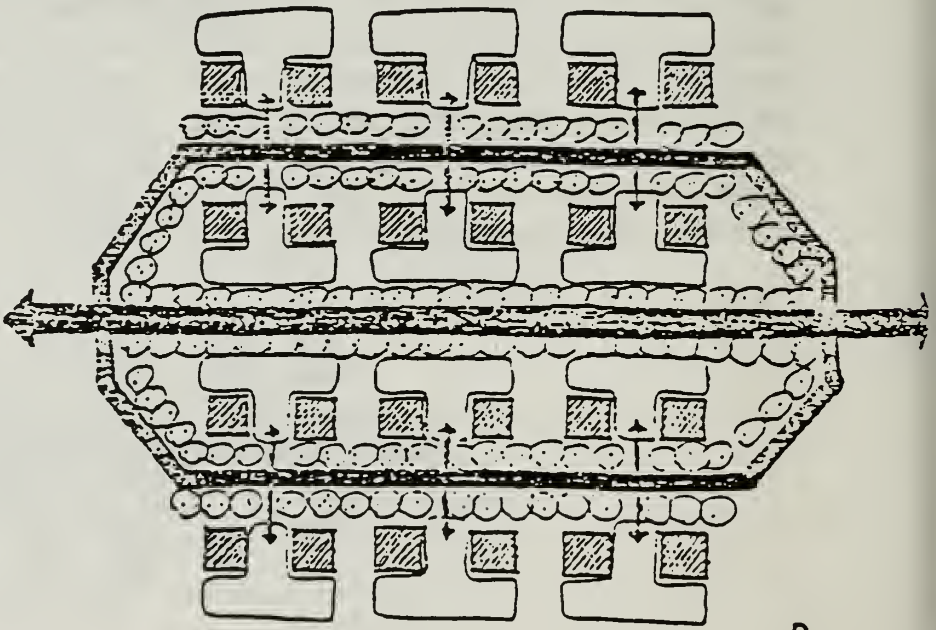
The shared drives shown in Concept B may be extended to make a cul-de-sac or loop road permitting an extension of the business area without extending the strip. The number of cuts may also be reduced with all the beneficial results of Concept B. In the scheme shown one drive serves four businesses instead of two, as shown on Concept B, or one each, as shown on Concept A. This consolidation of businesses enables development with unified architecture and landscaping. In addition, it encourages the shopper to move comfortably from business to business on foot, eliminating the need to move the car between each errand.



C

Loop Road:

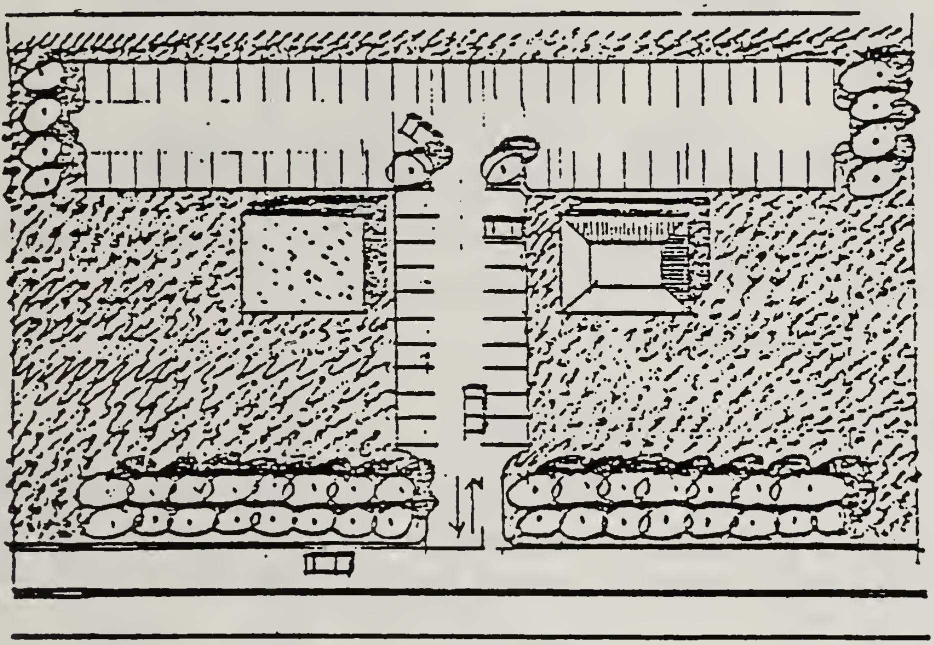
A loop road eliminates cuts on the main road entirely and opens new areas for business. The scheme shown has all the advantages of Concept C; however, the community must be careful that the new road does not assume all the problems and adverse characteristics of the original strip. This can be done by superimposing Concept C on the loop road. In some cases the highway on which the strip is located has been relocated or straightened leaving abandoned right-of-way which can be utilized for a loop road.



D

C. Shared Parking in Rear:

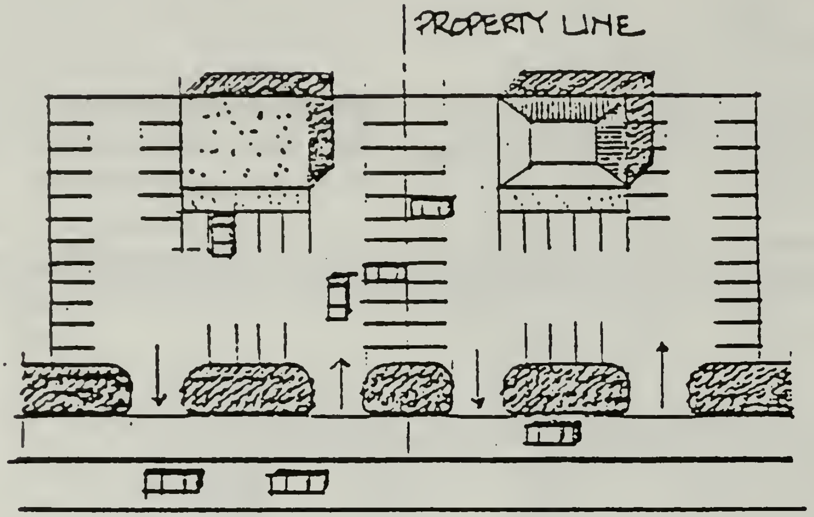
Further design improvements can be made by placing all parking at the shared property line or in the rear of the buildings. The front of the building can be landscaped more effectively than when it is disrupted by parking.



C

A. Separation of Entrances and Exits:

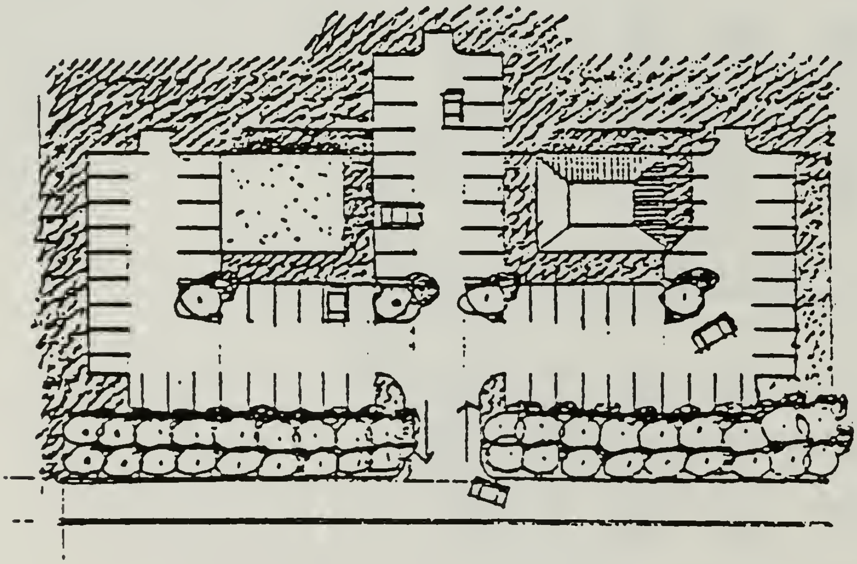
Modest improvement can be made on the convential strip by separating entrances and exits.



A

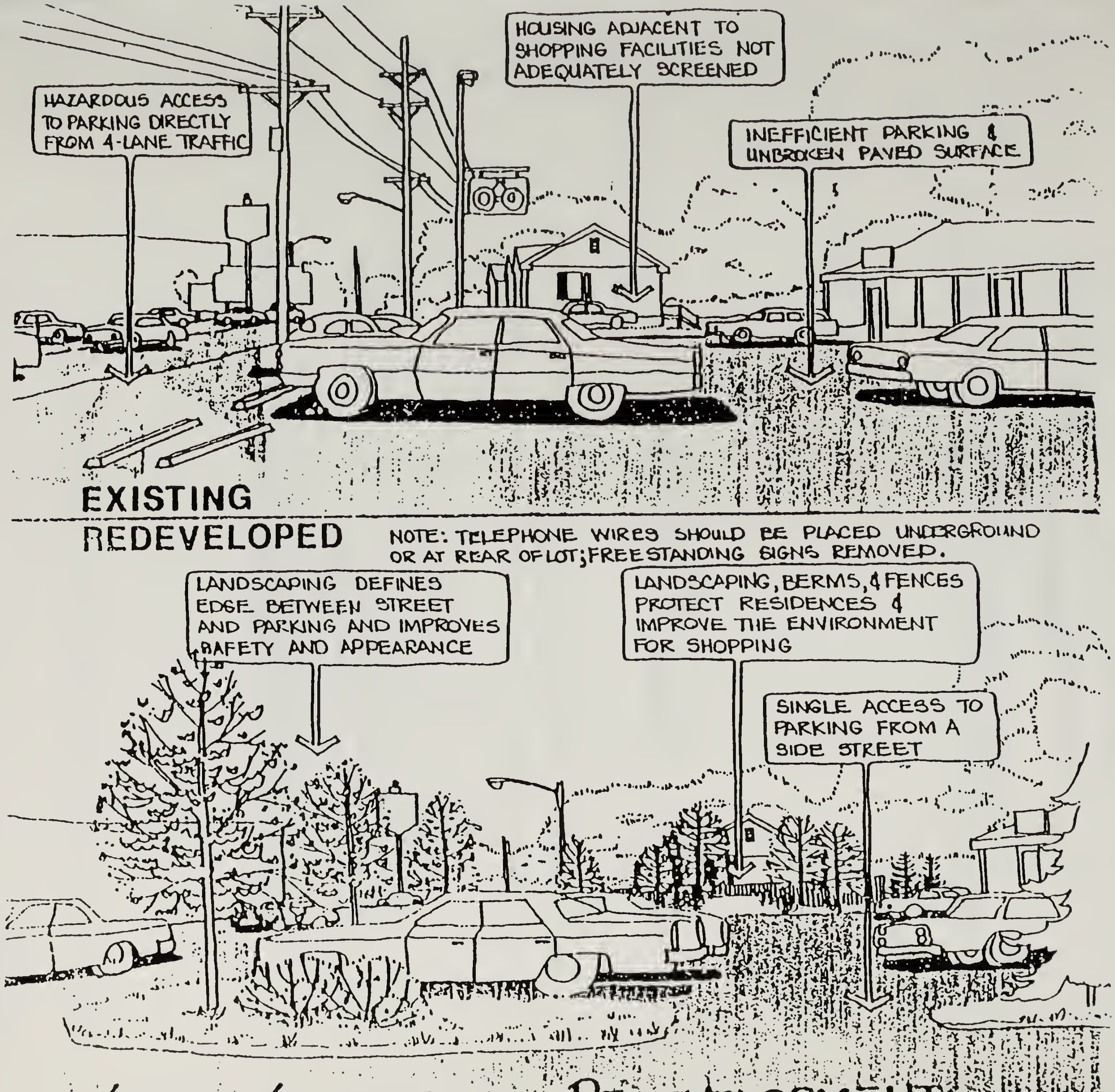
B. Shared Driveways and Parking:

Shared access and parking with the shared area along the property line increase safety and improve appearance. The design can reserve area for landscaping along the street. The number of spaces may be increased by extending beyond the rear building line.



B

PLATE ⑥

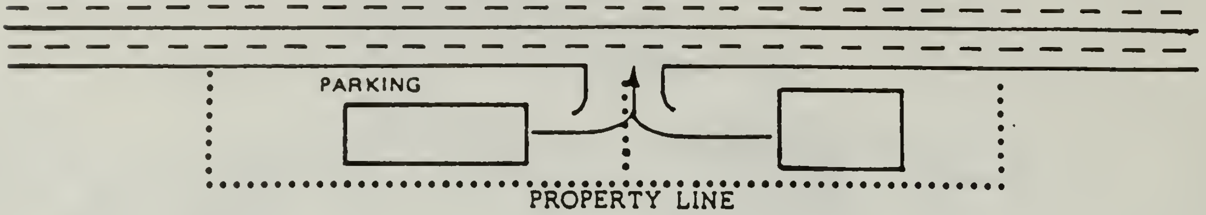

HAZARDOUS ACCESS TO PARKING DIRECTLY FROM 4-LANE TRAFFIC
HOUSING ADJACENT TO SHOPPING FACILITIES NOT ADEQUATELY SCREENED
INEFFICIENT PARKING & UNBROKEN PAVED SURFACE
EXISTING
REDEVELOPED
LANDSCAPING DEFINES EDGE BETWEEN STREET AND PARKING AND IMPROVES SAFETY AND APPEARANCE
LANDSCAPING, BERMS, & FENCES PROTECT RESIDENCES & IMPROVE THE ENVIRONMENT FOR SHOPPING
SINGLE ACCESS TO PARKING FROM A SIDE STREET

NOTE: TELEPHONE WIRES SHOULD BE PLACED UNDERGROUND OR AT REAR OF LOT; FREESTANDING SIGNS REMOVED.

STRIP COMMERCIAL REDEVELOPMENT

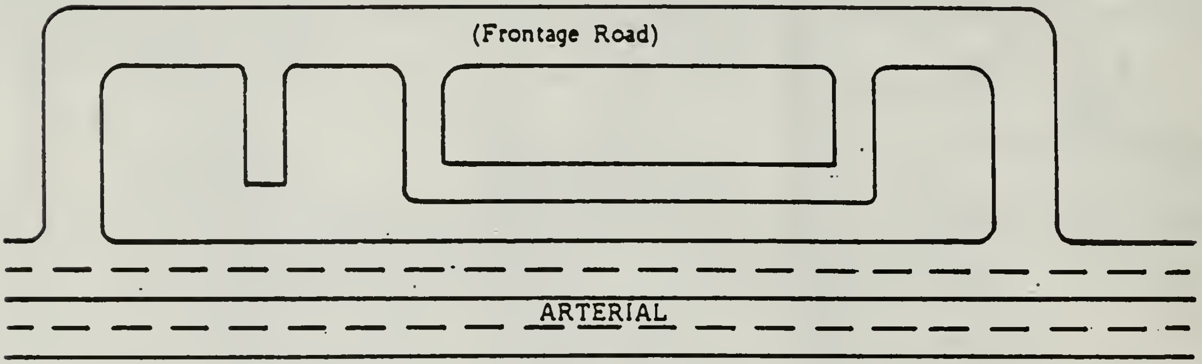
SOURCE:
"A STRATEGY FOR ENVIRONMENTAL IMPROVEMENT, EMPHASIS: COMMERCIAL", (ST. LOUIS COUNTY DEPARTMENT OF PLANNING, 1970).

FIGURE 7
EXAMPLE COORDINATED ACCESS PARKING SYSTEM



SHARED ACCESS ON PROPERTY LINE

FIGURE 8
EXAMPLE SERVICE DRIVES



INDUSTRIAL PARK WITH FRONTAGE ROAD

*Design standards based upon site plan review.

APPENDIX I

MODEL TRAFFIC ACCESS REGULATIONS

SOURCE: AUSTIN, TEXAS, “LAND DEVELOPMENT CODE”.

Sec. 13-5-84 TRAFFIC ACCESS REQUIREMENTS FOR PRINCIPAL ROADWAY AREAS

(a) No direct access from a lot to a Principal Roadway is permitted on a subdivision plat or a site plan if the lot has less than 200 feet of frontage on the Principal Roadway and alternative access is available. For purposes of subdivision plat approval only, in this section a Principal Roadway' shall include the extension of such roadway into the planning jurisdiction of the City. Such alternative access may include without limitation access to interior streets or abutting streets, joint use driveways, or access easements to the principal roadway or another street, but shall not include a local street serving a primarily single-family residential neighborhood or other access if the Director of the Office of Land Development Services deems access along the alternative route to adversely affect public safety.

(b) Joint access may be required at the time of subdivision or site plan approval for abutting lots which have insufficient frontage to allow a driveway approach for each lot in accordance with the requirements of the Transportation Criteria Manual.

(c) If a property is prohibited from direct access to a Principal Roadway and no alternative access under subsection (c) is available, the property shall be allowed one driveway approach.

(d) This section shall apply to the entire legal tract, regardless of leases or out-parcels.

Sec. 13-5-85 TRAFFIC ACCESS REQUIREMENTS FOR HILL COUNTY ROADWAYS

(a) This section applies within the zoning jurisdiction of the City.

(b) Access to a Hill Country Roadway may be prohibited from any tract having access to a street intersecting with a Hill Country Roadway or any tract with frontage on a Hill Country Roadway which has access through an existing joint-use access easement or driveway. If access is not prohibited, access to a Hill Country Roadway is restricted to one driveway unless:

(1) The estimated daily traffic volume for the single driveway exceeds 5,000 vehicles per day;

2) The traffic using the single driveway would exceed the capacity of a stop sign controlled intersection during one peak street traffic hour or the peak site traffic hour; or

(3) A competent traffic impact analysis demonstrates the need for an additional driveway due to traffic conditions and the Director of the Office of Land Development Services agrees that an additional driveway is required.

No more than two access points shall be permitted from any one development onto a Hill Country Roadway.

(c) The maximum practical spacing between driveways shall be provided. Unless approved by the Director of the Transportation and Public Services Department, no driveway accessing a Hill Country Roadway shall be located:

(1) Closer than 300 feet from the nearest adjacent driveway, unless no other access is available to a tract of land;

(2) Where the sight distance is less than 550 feet;

(3) On the inside radius of a curve; or

(4) Where the roadway grade of the Hill Country Roadway exceeds 8%.

(d) For purposes of this section, a joint-use driveway means a driveway located entirely or partially on one tract of land which is available for use as access to and from a public street by an adjoining tract of land. Subject to the Highway Vegetative Buffer provisions in Sec. 13-7-49, each applicant may be required to provide an easement for a joint-use driveway across his or her tract from property line to property line generally parallel with the right-of-way he Hill Country Roadway for the use of adjacent property owners when the adjacent lots have insufficient frontage for access, as determined under this section by the Director of the Office of Land Development Services. No access to a Hill Country Roadway through a joint-use driveway will be permitted for tracts which do not have frontage on a Hill Country Roadway unless recommended by the Director of the Office of Land Development Services. If the applicant is required by the City to construct improvements such as providing wider driveways or additional driveways for use as a joint-use driveway, the owner(s) of the adjoining tract(s) benefitted by such joint-use driveway shall be required by the City to participate in the cost of such improvements on a pro rata basis as follows:

(1) If the owner of the tract benefitting from such joint-use driveway is not ready to participate in the cost of such improvements at the time of the construction of those improvements, the owner of the tract upon which the improvements are to be constructed may elect not to construct them to accommodate the adjacent tract but shall leave sufficient area for such construction.

(2) If the applicant elects to construct such improvements to serve an adjoining tract, the City shall require the owner of a benefitted tract to share in such cost at the time such adjoining tract is developed.

(e) In computing the amount of impervious cover on the site for the purpose of Sec. 13-2-590, there shall be excluded from such computation: (i) 110% of impervious cover required for the sole purpose of providing access from adjoining land to a joint-use driveway (excluding parking spaces and aisles serving parking spaces) located entirely on the site; and (ii) 50% of the impervious cover required for the sole purpose of providing a joint-use driveway (excluding parking spaces and aisles serving parking spaces) where no portion of [illegible] driveway is located on adjoining land.

(f) Minimum spacing between local streets shall be 600 feet and between collector streets shall be 1,320 feet.

(g) Improvements to intersections with a Hill Country Roadway will be required when determined from a review of a traffic impact analysis. The construction of grade-separated interchanges which provide the access required for an individual project is discouraged unless the interchange is also located at the intersection of an arterial street as shown in the Roadway Plan or is located based on appropriate spacing for weaving maneuvers at ramps and resulting capacity considerations.

(h) On a divided Hill Country Roadway, future connecting streets shall align with existing median breaks to the greatest extent practicable.

PIONEER VALLEY
PLANNING COMMISSION
26 Central Street • West Springfield, MA 01089
(413) 781-6045